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THE UNIVERSITY OF ALBERTA

FEMALE LABOUR FORCE PARTICIPATION, LIFE CYCLE STAGE AND FERTILITY

by

ALICE WAI-PING LEUNG

A THESIS

SUBMITTED TO THE FACULTY OF GRADUATE STUDIES AND RESEARCH

IN PARTIAL FULFILMENT OF THE REQUIREMENTS FOR THE DEGREE

OF MASTER OF ARTS

DEPARTMENT OF SOCIOLOGY

EDMONTON, ALBERTA

FALL, 1990

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ISBN 0-315-64841-4

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The undersigned certify that they have read, and recommend to the Faculty of Graduate Studies and Research, for acceptance, a thesis entitled "Female Labour Force Participation, Life Cycle Stage and Fertility" submitted by Alice Wai-Ping Leung in partial fulfillment of the requirements for the degree of Master of Arts.

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ABSTRACT

The present thesis examines the associations between female labour force participation, life cycle stage and fertility. The data used are taken from the Growth of Alberta Families Study conducted in Edmonton.

The literature indicates that female labour force participation is influenced by many socio-economic factors. The variables investigated in the thesis include actual family size, age, work experience, age at first marriage, marital status, family income, education, age at first birth and birth intervals. Their influence on participation are examined in the context of the family life cycle whose various stages are differentiated by the absence or presence of children, and by the age of the children. The thesis also sets out to study the relationship between female labour force participation and the preferred 'quality' of children as advocated by Becker. This quality concept is represented by the women's intended support to their children's post-secondary education.

The thesis first examines the influences of these variables, including life cycle stage, on the labour force participation of the respondents. It is found that life cycle stage has no profound effect on employment status, but rather serves as a strong intervening variable affecting the relationship between fertility and female

labour force participation.

The thesis then pursues to examine the effects of these variables on the employment status of women at each life cycle stage. Work experience is found to be the most important in explaining employment in all life cycle stages except when children are very young. Contrary to established theories, educational attainment bears no significant impact on labour force participation in all life cycle stages. Education, on the other hand, supports established findings that it is inversely related to fertility.

Family income is found to be important in explaining participation before women have children but its effect is non-conclusive in all other life cycle stages. Age at first marriage is positively related to labour force participation. The effects of marital status, age at first birth and age of respondent are not important.

The preference for 'quality children' appears to be an ideal among women before they have children. During later cycle stages with the arrival of children, other concerns seem to override the importance of future education. Consequently, the intended contributions decrease as children grow older.

The thesis also identifies the differential patterns of associations between most of the independent variables. It appears that the socio-economic variables which have

considerable influences on female labour force participation operate fairly predictably in all life cycle stages except when children were very young. This suggests the presence of the 'employment squeeze' when the importance of paid employment is diminished in competition with the demands of caring for young children. In exploring Becker's 'quality of children' concept, it is found that educational attainment of women and life cycle stage have some influence on the intended contributions to the children's post-secondary education.

The general conclusion of the thesis is that the relationship between female labour force participation, life cycle stage and fertility are shaped not only by various socio-economic factors as confirmed by many studies. It is also possible to delineate the conditions and qualifications that explain such relationships.

ACKNOWLEDGEMENTS

The author is indebted to Professors K. J. Krotki and P. Krishnan, co-directors of the Growth of Alberta Families Study, for their permission to use data from the study in this thesis. The author also wishes to give special thanks to Professor Krotki for serving as chairman of the thesis committee, and for his direction, guidance and encouragement from the inception to the completion of this thesis. Acknowledgements are also due to Professors G. Jarvis and W. Gainer for serving as committee members. The author is also grateful to Ben Leung for his understanding, support and editorial assistance.

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CHAPTER 1

INTRODUCTION

1.1 The Problem

The pattern of association between female labour force participation, life cycle stages and fertility is important for the understanding of the impacts of the changing values and lifestyles on our society. It has been observed that female labour force participation in Canada has increased dramatically in the last two decades. In 1951, 22.0% of the labour force in Canada were women. In 1971, the percentage of women in the labour force had increased to 34.3%. During the same period, Canadian fertility has declined. The crude birth rate in 1951 was 27.2 per 1,000 population and in 1971, the crude birth rate had lowered to 16.8 per 1,000 population. There has been a number of studies indicating that the association between this surge in female labour force participation and the decline in fertility can be explained more fully by incorporating the concept of the life cycle (Oppenheimer, 1970; Mott, 1972; Groat et al., 1973; Sweet, 1973).

The interaction of these phenomena can have broad economic, demographic, sociological as well as psychological implications.

1.2 Economic Implications

On the macro level, female labour force participation affects the size and structure of the overall labour force which constitutes the number of producers. On the micro level, a woman participating in the labour force and earning an independent salary, qualifies herself as an independent viable consumer, making decisions on purchases not only on the individual level but also affects immensely the consumption patterns on the family level.

1.3 Demographic Implications

As mentioned earlier, female labour force participation influences the size and structure of the labour force. It has been observed that the pattern of labour force participation of married women consists of two peaks in the female life cycle, one before childbearing in the early and late 20's and the other after completion of childbearing when the youngest child reaches school age (Oppenheimer, 1970; Decore, 1976). Another observation of demographic significance is that female labour force participation has a negative association with fertility. The result is that the size and age-sex structure of

the future labour force is affected.

1.4 Sociological and Psychological Implications

Researchers in the disciplines of sociology and psychology have frequently employed various sociological and psychological variables in an attempt to explain the pattern of association between female labour force participation, life cycle stage and fertility. These variables include : the desire for upward social mobility, the desire to contribute to the society through paid work, the availability of jobs, the availability of child care services, attitudes on employment outside the home and family, religion, education, ethnicity, location of residence, family situation during childhood, the practice of birth control and so on. The theoretical importance of these variables has largely been established and many have been used in the analysis of fertility.

1.5 Purpose of the Study

The purpose of this thesis is to examine the relationship between female labour force participation at different life cycle stages, and to explain how patterns of participation are affected by fertility and selected socio-economic factors. The factors (independent variables) taken into consideration include marital status, age, education, age at first marriage, income, interval between births, willingness of respondents to provide post-secondary

education support to children, numbers of years worked and family size. An attempt will be made to assess the relative strengths of these factors in predicting the labour force participation of women at different life cycle stages (dependent variables) through the application of multiple regression analysis using dummy variables. The data used in this thesis are taken from the Growth of Alberta Families Study (GAFS) conducted in Edmonton in 1974.

CHAPTER 2

REVIEW OF LITERATURE

This chapter presents a review of background literature with empnasis on the theoretical and empirical findings of studies relevant to the thesis. Based on the findings of the literature review, research hypotheses for the thesis are formulated. These are presented in the last section of the chapter.

2.1 On Female Labour Force Participation and Fertility

Different views on the association between female labour force participation and fertility are held by serious researchers in the subject. There is overwhelming evidence to support the existence of a negative relationship between female employment and fertility (Blake, 1965; Sumpass and Westoff, 1970; Cain, 1966; Cho et al., 1970; Collver and Langlois, 1962; Freedman and Coombs, 1966; Hawthorn, 1970; Hawthorn, 1970; Kupinsky, 1971; Nye and Hoffman, 1963; Ryder and Westoff, 1971; Stycos and Weller, 1967; Sweet, 1973; Urlanis, 1967). Despite the volume of evidence for the negative association between female labour force participation and fertility, the direction

of causation between these two phenomena has encountered much controversy (Kupinsky, 1977).

Blake (1965) and Davis (1967) presented the view that female labour force participation would eventually lead to lowering the desire for more children. Many researchers support this causal direction (Collver, 1966; Collver and Langlois, 1962; Hoffman and Hoffman, 1973; Kupinsky, 1968, 1971; Ridley, 1959; Ryder and Westoff, 1971; Whelpton et al., 1966). The strong negative impact of female participation in the labour force on fertility has led to a unanimous conclusion that in the United States, female employment is causally related to low fertility.

Other researchers have found that the causal path is from fertility to work. They have asserted that other factors such as family size and age of children are effective determinants influencing women's decisions to enter or not to enter the labour force (Cain, 1966; Cohen et al., 1970; Mott, 1972; Sweet, 1973).

Some researchers have demonstrated that the negative relationship between female labour force participation and fertility is affected by other antecedent variables and is thus spurious (e.g. Mincer, 1963). A woman's previous experience with the mother and the worker role may influence her decision to have children (Groat et al., 1976). Others suggest that the relationship is influenced by factors from many perspectives such as economic, psycholo-

gical, social and cultural perspectives (Fong, 1976; Mason, 1974; Rao, 1972; Weller, 1968). Some of these factors include subfecundity, attitudes toward work, work schedules, maternity leave, availability of rewarding jobs and the importance of the wife's income in supporting the family.

2.2 On Life Cycle Stage

The concept of the family life cycle, first introduced as a framework in the study of the nuclear family, has the following characteristics. The cycle begins with the formation of the family through marriage, continues to a different and prolonged stage with the birth and the upbringing of children until they are independent and leave home, and ends when the family is terminated by divorce or by the death of one spouse. The life cycle presents a dynamic view of the family through different phases as the members of the family assume new positions and roles while certain demographic, social and economic events occur. The concept refers to a complex phenomenon that takes into account the change in family structure, composition and behaviour and cannot be handled in a fixed format since the entrance into a particular phase of the cycle is largely determined by demographic events that vary in times of occurrence among families. Families that start at a given time may experience phases of the life cycle at different periods, and at different ages of the

family heads than other families that began at the same time. In spite of this lack of uniformity, a quantifiable and operational description of the stages of the family life cycle developed by Glick (1947) was widely used with demographic data. These stages are: first marriage, birth of first child, birth of last child, first marriage of last child and death of one spouse.

The concept of the life cycle squeeze was introduced to describe the situation when the heads of the family are approaching the peaks of their earnings potential, but family expenditures are rising at an even faster rate. This is particularly true when children are acquiring post-secondary education and require family support. Oppenheimer (1974) found that among men in their forties and early fifties, when family income needs are highest, earnings peak at the time only among selected occupational groups. These include high-level professional, managerial and sales occupations. To prevent a deterioration in their living standards an additional income brought into the household usually by the wife's employment may be necessary.

2.3 On Female Labour Force Participation, Life Cycle Stages and Fertility

The importance of the interaction of life cycle stages and fertility on female labour force participation has been emphasized in many studies. Sweet (1973) found

that the change in women from the traditional role of home-makers and mothers to seeking employment outside the nome varied significantly with different family life cycle stages. Some writers tend to assume that the labour force participation of married women is associated with the female life cycle, one before childbearing in the early and late 20's and the other after completion of childbearing when the youngest child reaches school age (Oppenheimer, 1970, p.54 ; Decore, 1976, p.111).

A number of studies report that after controlling for the different stages of the life cycle the strong negative association between female labour force participation and fertility is decreased considerably (Bumpass, 1968; Mott, 1972; Oppenheimer, 1974; Sweet, 1970, 1973; Weller, 1976). Evidence from these studies shows that the negative relationship is highest at the early stage of the family life cycle and tends to become weaker and less significant in later stages of the family life cycle.

Ostry, in a study on the female workers in Canada, reports a significant inverse relationship between female labour force participation and fertility. Among the many intervening variables that complicate the issue, the stage of the family life cycle, as determined by the age of the youngest child, is found to be the most important variable. (Ostry, 1968, pp. 17-19).

Mott (1972) had conducted a study on fertility and

female labour force participation in the light of different life cycle stages of women, namely, between marriage and first child, and between first and second, second and third, and third and fourth child. He found that female labour force participation rates were high among women with at least twelve years of schooling, irrespective of life cycle stage. Labour force participation in one life-cycle interval was also a good predictor of participation in subsequent life cycle intervals.

Cove et al. (1975) suggests that the family is important in the allocation of family resources under the pressures of multiple and conflicting demands. These resources and pressures are variable and affected by factors internal to the family and by external social and economic conditions. They vary with different stages of the family life cycle. The later the arrival of children during the period of family formation, the more time a couple has to accumulate family resources and to establish a sound financial situation. With the arrival of children, while the income "per capita" in the family decreases and the expenditure increases, the demand and pressures to support the children as well as to maintain a desired life style are likely to be high. Thus, the amount of economic pressure is associated with the time of the arrival of children and the family size. At the other end of the life cycle, when children are grown up and leave home, the couple will be relieved of the economic burden of supporting the

children, but will face new pressures such as increased medical costs due to old age and income reduction upon retirement.

2.4 On Education

The importance of education on female labour force participation and fertility has been widely recognized. Greater educational attainment of women increases their opprotunity to find satisfying and financially rewarding employment outside the home. The opportunity to seek gainful employment offers them an alternative role to the traditional role as mother and homemaker. A number of studies have confirmed a positive relationship between education and female employment (Sweet, 1973; Hoffman, 1973; Klein, 1965). It has been hypothesized that the higher the educational atteinment of women, the greater the possibility of satisfying the psychological needs of challenge and power which have been developed as a result of the education. Educated women are more likely to find more satisfaction in the workplace than at home as mothers and homemekers.

Education has been found negatively related to completed fertility (Henripin, 1972; Cain and Weineger, 1973). Female educational attainment may contribute to a fuller understanding of contraceptive knowledge and a more successful adminstration of these techniques leading to lower fertility.

Henripin (1972), in his study on Canadian fertility, suggests that schooling develops a rational outlook necessary in determining the living conditions and the desired number and quality of children within the family. Schooling also leads to the development of special tastes, needs and desires which are more difficult to satisfy when there are a lot of children in the family. A woman may face conflicting roles when time, energy and resources devoted to meet these needs cannot be spared to meet the needs of each child. Access to knowledge about contraceptives is also easier for a better educated person. The better educated the person, the more effectively he uses the technique. Henripin's study shows that educational attainment is negatively related to fertility when other factors are controlled. There is a 30% reduction in fertility in the transition from the elementary to the university levels. Among women who have attended secondary schools, two thirds of this reduction is reflected. The trend is a general decline of fertility by all education groups, but the rate of decline differs with different cohorts (Henripin, 1972, pp. 237-256).

Other studies in the United States reveal a significant inverse relationship between female educational attainment and fertility (Cain and Weiniger, 1973; Kiser, 1967). Kiser reports that in spite of a relative increase in the fertility of college educated women from 1960 to 1970,

married college women still had the lowest fertility rates. The inverse relationship remains even when data were controlled by age and occupational groups of the husband (Kiser, 1967, p.222).

Rindfuss and Sweet (1978, p.27) observe that there are two distinct trends within each education group. The first observation is that the pattern of fertility has become more compact. It is compact in the sense that most births occur during the prime years of childbearing. The second observation is the trend toward younger fertility. However, the fertility behaviour of women who attended college is the only exception to this trend. There is indication that this upturn in the mean age of fertility will be expected of women in other education groups. It has been shown that the fertility of less educated groups declined somewhat later than those with college education. The same authors also confirmed an inverse relationship between education and fertility after other factors including age at marriage, are controlled.

2.5 On Income

Many studies have attempted to establish the relationship between income and fertility. A number of these studies have confirmed a positive relationship between income and fertility when other factors are controlled (Becker, 1961; Henripin, 1963; Rao, 1975; Beaujot,

1975; Maduri, 1979). Rindfuss and Sweet (1977) also report a positive relationship between husband's income and recent fertility in the United States. Anticipated changes in the husband's income are significant in determining the timing of births.

Easterlin (1966) argues that fertility of couples are determined by potential income expectations. The increase in fertility of the early post-war period is a function of the perception of newly-weds to a high potential income at a time of relatively low expectation for consumer goods. The baby-boom children grow up at times of relative affluence and become accustomed to expensive levels of consumption. When relative income is low and consumption preferences are high, the post baby-boom couples will decide on a smaller family size in order to stay within the aspired lifestyle.

The relationship between relative income (i.e. one's actual income in relation to the income of one's peers in the same socio-economic group) and fertility has been studied by a number of researchers (Freedman, 1975; Kinz, 1965; Bernhardt, 1972; Easterlin, 1972). A generally weak but positive association between relative income and fertility has been established. Using data from the 1967-1968 Toronto Fertility Study (Balakrishnan et al., 1975), Chaudhurry (1977) applied multiple classification analysis

to examine the effect of relative income on fertility. He found that relative income has a non-uniform predictive power across all social groups. The positive relationship is pronounced except for low educational groups and occupational groups that require little or no career training.

Other researchers expanded the focus on income to include other economic considerations like prices, aspirations and quantity or quality of children. Thorton's study (1979) found that economic indicators on child quality are negatively related to family size. The concept of 'quality of children' was made much of by Becker (1960). He presented an economic framework for the analysis of fertility in which he emphasized that children, from an economic point of view, are similar to commodities, and he tried to show that the theory of demand for consumer durables is applicable to the study of the demand for children. Parents, differentiated by their values and tastes, may choose to possess 'high quality' children or 'low quality' children, while the term 'quality' refers only to the level of expenditure spent on the children. A rise in income will lead to a desire to increase the quality and the quantity of children. However, the increase in quality is generally large and the increase in quantity is generally small. Over the years, the effect of rise in income on fertility

could have been offset by the depressor effect of three factors: the decline in child mortality, the rise in the cost of raising children and the increase of contraceptive knowledge. Becker found that when contraceptive knowledge was held constant, income and fertility showed a positive relationship.

Leibenstein (1975) in his economic theory of fertility decline, expounded further from Becker. He claimed that the decision to have high or low 'quality' children is affected by the relative expenditure on status goods among different status groups. As income goes up, the proportion of income spent on ordinary goods decreases while the proportion spent on status goods will increase. Since marginal expenditure on ordinary goods because of an additional child declines with the number of children in the family, the proportion of additional cost in having an additional child in relation to income is thus higher among low income families than among high income families. This may lead to the expectation that high income families will have more children. However, when the concept of status goods expenditure is introduced, the relationship becomes inverse. Leibenstein also presented the concept of diminishing utility of children. It would be necessary for a family to give up some of the status goods in order to support additional children. Different from Becker, he contends that the

levels of expenditure devoted to children gives only a partial measurement of the 'quality' of children. Education and home environment are examples of other important non-economic factors affecting the decision of family size.

There are some studies that support the hypothesis that women work outside the home for financial reasons. One most acclaimed reason is to maintain the family's standard of living. Sweet (1970) uses the income adequacy theory to explain the likelihood of a woman's participation in the labour force. The hypothesis is that a well-educated woman is more likely not to work if her husband's income is high. On the other hand, if her husband's income is low, she is more likely to work and to restrict her family size. In this case, her opportunity costs of having children are much greater.

2.6 On Opportunity Costs and Fertility

Human-capital economists argue that a highly educated woman has a high earnings potential. This contributes to high opportunity costs in childbirth and childrearing when a woman cannot be gainfully employed for a certain period of time. According to Mincer and Polachek (1973), the post-school training, skills and earnings potential constitute the 'human-capital investment'. The longer the time one spends in the labour force, the more one's human-

capital accumulates. On the other hand, an interruption or termination of participation in the labour force not only interferes with the accumulation of the human-capital, but also depreciates the value of the human-capital one has already attained.

Post-school training, which can be obtained formally by attendance at technical or adult training institutions, or informally through training on the job or work experience, together with the number of work years of married women should have a positive effect on the employability and earnings potential. The fact that a woman stops working for a length of time due to childbearing can have a negative effect on her future employability and earnings potential. Furthermore, the skill that she might have acquired during her school years and the post-school training that she might have gained informally during her employment, will start to depreciate when she stops working. The earnings foregone due to these factors add up to the opportunity cost of childbearing.

The concept of the relative costs and benefits in childbearing was introduced in an attempt to establish an economic framework for the analysis of fertility (Becker, 1960; Mincer, 1963). It is argued that quality children are consumer durables. The opportunity costs for childbearing constitute the earnings foregone by not working.

Other studies suggest that the opportunity costs and benefits of childbearing differ from one family life cycle stage to the next (Beckman, 1973; Hoffman, 1972).

McDaniel (1978), using data from the Growth of Alberta Families Study, examines the importance of the effect of economic variables on fertility. Some of the independent variables employed in the cohort analysis include relative income, feelings of financial success, proportion of years respondent has worked, post-secondary support for children and respondent's implied years lost through childbearing. The author reports that relative income and post-secondary support do not have an explicit relationship on fertility. Feelings of financial success is negatively related to fertility aspirations and implied work years lost through childbearing is positively related to fertility. When cohort is eliminated from the analysis, the most important explanatory variables are relative income and proportion of years worked. There is evidence to suggest that proportion of years worked exerts more influence among older cohorts than among younger cohorts in explaining fertility.

2.7 On Age At Marriage And Age Of Respondent

Age at marriage of females has been widely recognized as an important determinant affecting fertility. The reason is that the earlier the age of marriage, the larger is the

number of years to be exposed to the risk of pregnancy, and vice versa. Every increase in the age at marriage means a reduction in the number of children to which the woman can give birth. However, it has been noted that the practice of modern contraception has a suppressor effect on the significance of age at marriage in determining fertility (Urlanis, 1967; p.236).

A study by Glick showed that age at marriage had significant effects on fertility rates in the United States. This relationship held when duration of marriage, education, religion and husband's income were controlled (Glick, 1967, p.212).

Rindfuss and Bumpass (1978) point out four ways that age of marriage can have a significant impact on fertility:

(1) Early marriages that occur as a result of premarital pregnancies are fecundity selective.

(2) The risk of unwanted pregnancy is reduced when a woman marries late.

(3) Women who marry late are exposed to greater risk of sub-fecundity before completing the desired family size.

(4) The relationship is spurious due to the correlation of age at marriage with other variables such as education and social background.

Social effects are probable influences on an older

bride's decisions on the size of her family. The older the woman, the more likely she is accustomed to the non-housewife, non-motherly role, the more likely that her peers have completed their families, and the less support from others she will receive for having a family.

Stolzenberg and Waite (1975) in a multiple regression analysis report that factors affecting female labout force participation exhibit a negative association with fertility expectations which decreases slightly as the respondent ages, but increases again at a later life cycle. They conclude that a woman's fertility expectation reduces as she becomes established in employment and identifies herself in the role of a working woman.

2.8 Research Hypotheses

The hypotheses to be tested in this thesis are generally drawn from the cumulative findings of the literature studied. An attempt will be made to establidh the patterns of female labour force participation as influenced by life cycle stages and fertility. The following conjectures will be tested:

(1) Women with relatively lowly paid job skills or low educational attainment are expected to have larger families than women with better job skills or higher educational attainment. It is expected that the former participate in the labour force

even at 'inconvenient' stages of the life cycle because of financial need.

(2) During childbearing and childrearing years labour force participation rates will be low among women with close child spacing intervals. These women will more likely participate in the labour force after the youngest child reaches school age.

(3) Women with high educational attainment or employable skills are more likely to prefer 'high quality' children in the indirect economic sense. They are more likely to stay in the labour force longer in order to be financially secure. Consequently the families can assist their children in the acquisition of post-secondary education. Such women are also more likely to have a small family size.

CHAPTER 3

DATA AND METHODOLOGY

This chapter presents a description of the data source used in this thesis, the definitions and measurement of the variables and the modification of data into dummy variables. The methodology of mulitple regression analysis is discussed in the second section.

3.1 The Data

The data used in this thesis are taken from the Growth of Alberta Families Study (GAFS) conducted in Edmonton during the period from November, 1973 to February, 1974. This was a conventional KAP (knowledge, attitude and practice) study of women aged 18-54. The survey sample was derived from a multi-stage stratified sampling design. A comparison with the 1971 Census showed that the respondents were reasonably representative of women aged 18-54 in Edmonton, both in ethnic composition and in the age distribution of married women (Krishnan & Krotki, 1976, pp.2-9). A total of 1045 women were interviewed on topics concerning family size norms, contraceptives usage and failures, and attitudes towards fertility related issues. In addition to cross-

sectional information on respondent characteristics and responses to specific questions, the study data include longitudinal information on family formation, income and employment which is used in this thesis. Responses from some relevant attitude questions are used to examine the desired 'quality' of the children of respondents. This information, together with other socio-economic variables, enables us to examine the pattern of female labour force participation at different life cycle stages.

3.2 Definition and Measurement of the Variables

The variables used in this thesis are: respondent's employment status, employment status by life cycle stage, life cycle stage, number of years worked, education, respondent's age, marital status, actual family size, age at first birth, family income, intended post-secondary support for children, age at first marriage and average interval between births. The definitions and measurement of these variables are presented below.

3.3 The Dependent Variables

Respondent's Employment Status (EMP)

This variable records the respondent's employment status. In the survey seven categories of responses were reported. These were: housewife, unemployed, unpaid family worker, homemaker , student, working housewife and other. For the purposes of the present study, this variable is

converted into a dummy variable. The category working housewife is coded 1 and all other categories, 0.

Respondent's Employment Status at Life Cycle Stage 1 (D1)

This variable combines the variable respondent's employment status (EMP) with the variable respondent's life cycle stage1 (LC1) which will be described under the section on the independent variables. Essentially it measures the employment status of those respondents whose current life cycle stage is before motherhood, when family size is zero. This variable is a dummy variable in which the observation of employment is coded 1 and non-employment is coded 0.

Respondent's Employment Status at Life Cycle Stage 2 (D2)

This dummy variable measures the employment status of respondents who are experiencing life cycle stage 2, that is, when children at home are under 6 years of age. Employment is coded 1 and non-employment is coded 0.

Respondent's Employment Status at Life Cycle Stage 3 (D3)

This variable measures the employment status of respondents who are experiencing life cycle stage 3, that is, when children both under 6 years old and over 6 years old are at home. As a dummy variable, employment is coded 1 and non-employment is coded 0.

Respondent's Employment Status at Life Cycle Stage 4 (D4)

This measures the employment status of respondents who are in life cycle stage 4, when children at home are all over the age of 6, that is, the age for elementary school entrance. Employment at this life cycle stage is coded 1 and non-employment is coded 0.

Respondent's Employment Status at Life Cycle Stage 5 (D5)

The variable measures the employment status of respondents who are in life cycle stage 5 when all children are over age 18. Employment at this life cycle stage is coded 1 and non-employment is coded 0.

3.4 The Independent Variables

Life Cycle Stages 1 to 5 (LC1 to LC5)

The variable life cycle stage is constructed mainly in terms of the female reproductive cycle in the social sense. This application is different from Glick's (1947) definition of the family life cycle in which events of family formation are of primary importance. The present variable defines the female life cycle in five stages clearly distinguished by the motherhood status and by the age of the children at home. This special categorization outlines the different periods during which a woman's participation in the labour force may be affected by the presence of her

children whose requirement of her time for attention and rearing differ with age. For the present study, the variable life cycle stage is transformed into a set of five dummy variables. Life cycle stage 1 (LC1) is coded 1 when respondent has no children. Life cycle stage 2 (LC2) is coded 1 when respondent's children are all under 6 years old. Life cycle stage 3 (LC3) is coded 1 when respondent's children are both under and over 6 years old. Life cycle stage 4 (LC4) is coded 1 when all children are over 6 years of age. Life cycle stage 5 (LC5) denotes the period when the respondent's children are all over 18 years old. This variable is used as a control variable and is not introduced into the regression equation. Its effect is assumed to be zero. This set of dummy variables is used in the first regression analysis to determine the effect of the female life cycle on female labour force participation.

Number of Years Respondent Has Worked (YRS)

This variable measures the number of years respondent has worked. The time reported for each full-time job is counted as full time, whereas the time reported for each part-time job is only counted as half time. The cumulative period is the value for the variable. This is an integer variable and is suitable for multiple regression analysis. There is no need to convert it into a dummy variable.

Respondent's Education (EDR1 to EDR4)

Educational level was asked in the survey in three questions. The first question recorded grades completed in elementary and high school. The second question asked whether respondent has acquired post-secondary training and the third asked on university training. This variable combines results from these three questions. It is coded categorically and is converted into four dummy variables. Education category 1 (EDR1) denotes an educational attainment of 0 to 8 years. Education category 2 (EDR2) describes an educational qualification of 9 to 13 years but no post-secondary education. Education category 3 (EDR3) describes an educational attainment of post-secodary education but no university. Education category 4 (EDR4) covers university education beyond high school. All positive responses to each dummy variable are coded 1 and other responses are coded 0. Education category 4 (EDR4) is used as a control variable and is not incorporated into the regression equation. Its effect is assumed to be zero.

Respondent's Age (RAGE)

This variable is an integer variable describing the completed age of each respondent. No conversion into dummy variable is necessary.

Respondent's Marital Status (MSTAT)

This variable was reported in the survey to consist

of seven categories: single, separated, widowed, married, divorced, living with someone, and married or living with someone. For our purposes the converted dummy variable is coded 1 for currently married or living with someone and coded 0 for all other categories.

Actual Family Size (AFS)

Actual family size is the number of live births reported for each respondent. This is an integer variable and does not need to be converted into a dummy variable.

Age at First Birth (AFB)

Age at first birth is the age when respondent gave birth to her first child. This is an integer variable and can be introduced into the regression equation without further adaptation.

Family Income (FINC0 to FINC6)

In the survey family income was reported in seven categories. These were: (0) nil, (1) under $3,000, (2) $3,000-4,999, (3) $5,000-6,999, (4) $7,000-9,999 (5) $10,000-14,999 and (6) $15,000 and over. Each category of these is converted into a separate dummy variable. Appropriate responses are coded 1 and other responses are coded 0. Family income category 6 (FINC6) is used as control and will not be

introduced into the regression equation.

Post-secondary Support For Children (PSSC1 to PSSC4)

This variable measures the extent of intended post-secondary support for children and is derived from responses of three questions asked in the survey. These questions were:

Question 194 - "Would you (and your partner) be willing to provide the major source of financial support if your child was attending post-secondary education ?"

Question 195 - "How much, if any, would you be willing to contribute ?"

Question 196 - "How long would you be willing to contribute this support ?"

These questions are used as indicators for the desired 'quality' of children in the indirect economic sense. Here, 'quality' refers to the amount of education one hopes his children will receive and is willing to finance. If we assume that the amount of expenditure on children improves the 'quality' of children (when perceived as a consumer durable), then the financial support for post-secondary education can be an indicator of such expenditure.

Category 1 of this variable (or PSSC1 as the dummy variable) consists of responses indicating less than $1,000 support, including no support, or room and board for one or two years, room only, or $500 to $999 for one year only.

Category 2 (PSSC2) consists of responses indicating $1,000 to $3,999 support, including room and board for 3 or more years, or 2 years, or full support for one year of post-secondary school attendance. Category 3 (PSSC3) consists of responses indicating $4,000 to $7,999 support, including those willing to contribute $1,000 to $1,999 for three years or more, or full support for two to three years. Categor 4 (PSSC4) includes responses indicating $8,000 or more of support including those willing to support for four or more years of post-secondary education. This last dummy variable is used for control only and will not be included in the regression equation. Its effect is assumed to be zero.

Age at First Marriage (AFM)

This variable is the age at first marriage as reported by the respondent when answering survey questions. This is an integer variable and will be included in the multiple regression analysis.

Average Interval Between Births (AIB)

This integer variable is constructed after calculating the average period of all the intervals between births as reported by the respondent. This variable is used in regression analyses on the dependent variables employment status in life cycles 2 to 5, when respondent has experienced motherhood.

3.5 Methodology

The methodology employed in the thesis is stepwise multiple regression using dummy variables. The technique for computer application is taken from Statistical Package for the Social Sciences (SPSS) (Nie, et al., 1975). The technique of multiple regression as an analytical tool in explaining social phenomenon has been addressed by many research scientists (e.g. Blalock, 1970; Kerlinger and Pedhazer, 1973). Details of the technique will not be elaborated here. However, in order to facilitate an easy understanding to the problem, a brief description of the technique, the assumptions and the major parameters as relevant to this thesis are presented below.

Multiple regression analysis is a statistical technique through which the relationship between a dependent variable and a set of independent variables can be analyzed. It can be used as a descriptive tool by which the linear effects of the independent variables on the dependent variable can be summarized. The individual effect of each independent variable on the dependent variable can be accounted for after the effects of other variables are controlled. Multiple regression analysis also produces an equation that indicates how changes in the values of the independent variables will affect changes in the value of the dependent variable. The stepwise multiple regression is a powerful variation in the

technique which recursively constructs a prediction equation adding one variable at a time. The first step incorporates the single independent variable which explains most of the variance in the dependent variable. The second step incorporates the next independent variable which is usually the second best predictor in conjunction with the first variable. Variables are then added one at a time at each step until all variables are included.

The stepwise multiple regression technique is appropriate for use when there is an attempt to establish the pattern of association between a dependent variable and a set of independent variables and to seek out the order of predictive power or influence among these independent variables. The analyses used in this thesis are stepwise multiple regression analyses which aim at both the descriptive and the predictive goals.

There are several assumptions required in multiple regression . One is that the associations between the dependent variable and the independent variables are linear and additive. The sample is drawn at random. The distributions of the values of each dependent variable for a given combination of independent variables follow the normal distributions. The distributions of the values of the dependent variable for each independent variable have the same variance - homoscedasticity (Blalock, 1972, p.430).

The error terms are assumed to be independent, have a mean of zero and equal variance.

In general, multiple regression analysis requires interval variables or variables that are measured on a ratio scale. This restriction can usually be handled through the conversion to dummy variables when nominal variables are of interest. Non-linear and non-additive relationship can employ transformation of variables through mathematical manipulations. In this thesis, dummy variables are used for all the dependent variables which measure the employment status of women in general and at each particular life cycle. Independent variables which are originally categorical in character, such as education, life cycle stage, marital status, family income, extent of post-secondary support are all transformed into dummy variables or sets of dummy variables. The last category of each variable is the residual category. For control purposes these residual dummy variables are not incorporated into the regression equations.

Multiple regression shows the linear relationship between a set of independent variables and a dependent variable while taking into account the interrelationship among the variables. The regression equation with dependent variable Y takes the form:

$$Y = @ + B_1X_1 + B_2X_2 + \cdots B_kX_k$$

where @ is a constant and B_i, the regression coefficient, and X_i, the independent variable.

The regression coefficient B, stands for the expected change in units of Y associated with a one unit change in X. From known values of the independent variables, this equation can be used as a prediction equation for Y, the dependent variable. The signs and magnitude of the regression coefficients describe the directions and strengths of the associations between the dependent variable and each of the independent variables.

Beta weights are standardized regression coefficients. The process of standardization eliminates differences in scale of measurement between the variables. The beta weights indicate the magnitude and the direction of relationship between the independent variable and the dependent variable when the effects of other independent variables are controlled.

Zero order correlation coefficients measure symmetrical associations between variables. The signs indicate positive or negative relationships only and one cannot distinguish the direct effect of one variable from the other. The zero order correlation coefficient matrix can be used to generate multiple regression and is usually consulted to detect multicollinearity, which is the state when some or all independent variables are highly intercorrelated. The problem can result in bisaed estimates and reduce the reliability of the prediction.

The square of the multiple correlation coefficient,

or R^2, refers to the percentage of variation explained by the regression equation. In stepwise regression analysis, R^2 measures the proportion of variance explained by each additional variable introduced into the regression equation. The amount of variance explained also describes the degree of prediction. The greater the R^2, the better is the prediction given by the particular independent variable. The variable with the least variance explained, thus the least prediction, is entered into the equation in the last step.

To determine the significance of the association between each independent variable and the dependent variable, t-values are used. These are obtained by dividing the regression coefficients by the standard errors of the regression coefficients. F statistics are used to determine the overall significance of the regression equation.

In the analyses that follow, the zero order correlation coefficients, multiple regression coefficients, beta weights, R^2 and t anf F values will be examined and compared. The purpose is to examine the strengths and directions of the associations, to establish the strengths of prediction among the independent variables on the dependent variables, and to test in this manner the hypotheses formulated in the previous chapter.

CHAPTER 4

LIFE CYCLE STAGE , FERTILITY AND FEMALE LABOUR FORCE PARTICIPATION

This chapter examines the results of the first regression analysis which investigates the effects of life cycle stage, fertility and related socio-economic variables on female labour force participation, as indicated by the dependent dummy variable employment status for women of all life cycle stages (EMP).

In this analysis, all independent variables listed in Chapter 3 with the exception of the variable average interval between births (AIB), are used. The reason for this exclusion is that we intend to examine the effects of all the other independent variables on women of all life cycle stages. To include average interval between births in the multiple regression analysis would limit the study sample to women who have given births to two and more children.

The independent variables used in the analysis which are of most interest to us are the dummy variables life cycle stages 1 to 4 (LC1 to LC4), and actual family size which measures the number of live births of the respondent and serves as an indicator of fertility. Other social background variables used include number of years worked, education

(EDR1 to EDR3), family income(FINCO to FINC5), respondent's age, age at first birth and age at first marriage. The variable extent of post-secondary support for children is an economic utilities variable which measures the 'quality' of children as expressed by the intended amount of support given to the children for the acquisition of higher education. The effects of these variables with the exception of the latter on female labour force participation have been studied by many researchers, as we have already indicated in the literature review. The importance of these variables on fertility has largely been established, and the interaction of some of these variables have been known to have definite effects on female labour force participation.

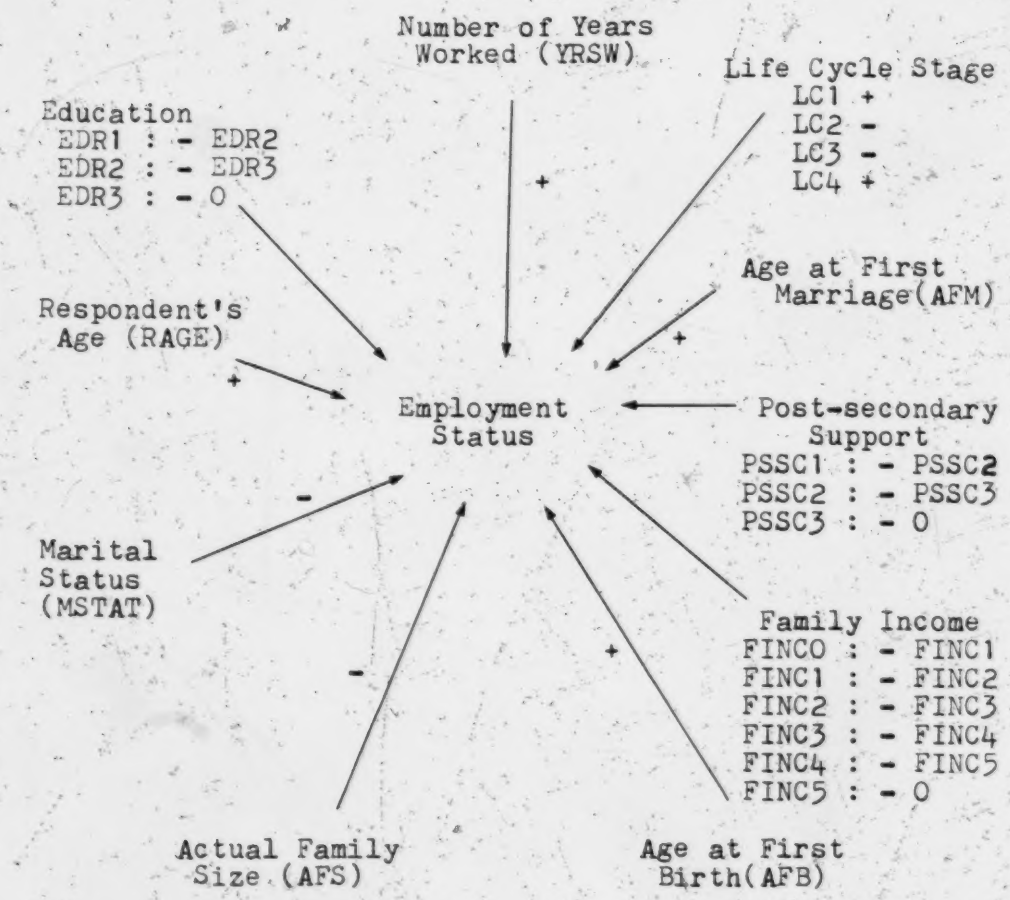
4.1 Hypothesized Relationships

Relationships between each independent variable and the dependent variable are hypothesized as illustrated in Figure 4.1.

Life cycle stage 1 (LC1), when the family sizes of respondents are zero, is expected to be positively related to female employment. The women are free from the responsibilities of childrearing and are most likely to devote their time and energy in employment. Life cycle stages 2 and 3 (LC2 and LC3) depict the presence of small children under 6 years of age. Women are most likely to stay home and perform the homemaker and maternal role because

FIGURE 4.1

HYPOTHESIZED RELATIONSHIPS BETWEEN INDEPENDENT VARIABLES AND EMPLOYMENT STATUS



of childcare responsibilities. In life cycle stage 4 (LC4), all children are of school age. Respondents may choose to work outside the home since considerable free time is available during the day when the children are at school. The children are older and are not as dependent on the mother as when they were young. Life cycle stage 5 (LC5) is used as control. This variable will not be used in the regression equation and its effect is assumed to be zero.

The variable number of years the respondent has worked (YRSW) constitutes her earnings potential. The longer the woman has stayed in the labour force, the more work experience and on the job training she has accumulated. She is also more likely to earn a higher salary. The number of years worked is also responsible for the development of an accustomed life style which is quite different from that of a mother and homemaker. The longer a woman has worked, the more likely she is to accept the role of a worker outside the home and the less likely she is to identify herself as a homemaker and mother. The hypothesized relationship with employment is expected to be positive.

Education is another indicator for human-capital investment. The higher the education, the higher the possibility of finding satisfying employment. It is hypothesized that women with education categories 1 and 2 (EDR1 and EDR2), when respondents have 8 years or less education, or 9 to 13 years of education respectively, are less likely

to participate in the labour force than women with some post-secondary education (other than university) (EDR3). One has to note that education category 4 (EDR4), some university, is used as a control variable whose effect is assumed to be zero. If women in the categories EDR1 to EDR3 are to follow an ascending order (up to the value o) in the opportunities for employment, the expected relationship will be negative. Thus education category 1 (EDR1) will have a negative association with employment, but the magnitude of the association will be less than the association expected of education category 2 (EDR2). Education category 2 (EDR2) is expected to have a negative but less association than expected of education category 3 (EDR3), which is expected to be negative.

Respondent's age (RAGE) is expected to be positively associated with the number of years worked. The older a woman, the more likely that she has accumulated some work experience, the more likely that her children are older, the more likely that she has a higher education, and thus the higher the probability that she will participate in the labour force. The expected relationship is positive.

Marital status (MSTAT) is a dummy variable in which married or living with someone is coded 1. It is expected that a woman living alone, whether she be single, separated, divorced or widowed (coded 0), have financial reasons to work. The expected relationsnip is negative.

Actual family size (AFS) is a measure of fertility. The larger the number of children, the less likely the woman will participate in the labour force. The expected relationship is negative, particularly among women in earlier life cycles when the children are young.

Age at first birth (AFB) and age at first marriage (AFM) are indicators of the beginning of the effective childbearing period of women. The earlier a woman starts her family, the longer the period that she will be exposed to the risk of pregnancy, and the higher her chance of completing her desired family size, and the less likely that she will work. The later a woman is married or has her first child, the greater the possibility that she will gain more education and work experience, and the more likely that she will be employed. These variables are expected to have positive effects on female labour force participation.

Family income (FINC0 to FINC5) is a set of dummy variables which measures income in an ascending order. Since the highest income category :FINC6 is used as a control, all expected relationships will be negative and in ascending order to 0. Family income is used here as a descriptive indicator of the financial situation at home when women choose to participate or not to participate in the labour force. Since family income constitutes both the husband's and wife's income or either one's income if the other does not work, it cannot be effectively used as a causal factor

to determine the need for woman to work for financial reasons. However, it is useful as an indicator for a desire for upward mobility, and a desire to maintain or improve one's standard of living, when considering a woman's participation in the labour force.

The extent of post-secondary support for children may pose an economic necessity and induce older women who have children attending post-secondary institutions to work. For younger women preparing to support children through higher education, participation may mean saving for the future. Since the highest amount of support (PSSC4) is used as control and the effect is set at zero, the effects of the other categories (PSSC1 to PSSC3) can be hypothesized to be negative and ascending to 0.

4.2 Results of Analysis 1

The effects of the independent variables on the employment status of women are examined employing the technique of stepwise multiple regression. Table 4.1 shows the summary characteristics of the analysis. The means, standard deviations and the number of cases are presented. The mean age of respondents in this study is 35.1 years, while the mean actual family size is 2.76 children, average number of years worked 4.3, and the mean age at first marriage and the mean age at first birth, are 20.9 and 23.1 years respectively. The number of cases in the analysis is 350.

TABLE 4.1

MULTIPLE REGRESSION ON EMPLOYMENT STATUS (EMP)

MEANS, STANDARD DEVIATIONS AND CASES

Variable	Mean	Standard Deviation
EMP	0.0534	0.2251
LC1	0.0	0.0
LC2	0.2640	0.4414
LC3	0 2163	0.4123
LC4	0.4607	0.4992
YRSW	4.3118	4.0975
EDR1	0.0983	0.2982
EDR2	0.5674	0.4961
EDR3	0.2360	0.4252
RAGE	35.1404	9.3840
MSTAT	0.9831	0.1289
AFS	2.7584	1.6021
AFB	23.0927	3.8806
FINC0	0.0	0.0
FINC1	0.0253	0.1572
FINC2	0.0337	0.1807
FINC3	0.0983	0.2982
FINC4	0.2584	0.4384
FINC5	0.3287	0.4704
PSSC1	0.0758	0.2651
PSSC2	0.1039	0.3056
PSSC3	0.1236	0.3296
AFM	20.8680	3.0317

Number of cases : 356

The mean for the dependent variable employment status is 0.0534. In the survey of 1045 women, 665 answered the question on employment. Of these 5 per cent responded presently working, 95 per cent responded to the following categories: housewife, student, unemployed, unpaid family worker, homemaker and student, and other.

Marital status (MSTAT) reports a mean of 0.9831, indicating that in the regression analysis, an overwhelming majority of respondents are of the married or living with someone status. In the survey, 784 (75%) of the 1045 respondents reported to be married or living with someone, and 261 (25%) reported as single, separated, widowed or divorced. The frequency distributions of the variables life cycle stages (LC1 to LC4), education (EDR1 to EDR5), family income(FINC0 to FINC5), post-secondary support (PSSC1 to PSSC3) are presented in Table 4.2

Results of the final step of the stepwise regression analysis are presented in Table 4.3. Altogether nineteen variables are included in the analysis as independent variables. The total variance explained is 6.14 per cent (R^2 = 0.06140). Number of years worked (YRSW) and age at first marrisge (AFM) are the only significant variables in the regression equation, as indicated by their respective t-values (2.97315 and 2.15772). Number of years worked accounts for 3.03 per cent of the variance explained (R^2 = 0.03039) and age at first marriage adds another 0.73 per cent of

TABLE 4.2
SELECTED FREQUENCIES

Life Cycle Stage	Frequency	Per Cent
1. No child (LC1)	336	32.2
2. Child < 6 (LC2)	176	17.1
3. Child <> 6 (LC3)	139	13.3
4. Child > 6 (LC4)	331	31.7
5. Child > 18 (LC5)	60	5.7
Total	1,045	100.0

Education	Frequency	Per Cent
1. 0-8 years (EDR1)	89	8.5
2. 9-13 years (EDR2)	502	48.0
3. Post-secondary (EDR3)	272	26.0
4. Some university (EDR4)	181	17.3
Missing data	1	0.1
Total	1,045	100.0

Family Income	Frequency	Per Cent
1. Nil (FINC0)	1	0.1
2. < $3,000 (FINC1)	15	1.4
3. $3,000-4,999 (FINC2)	30	2.9
4. $5,000-6,999 (FINC3)	66	6.3
5. $7,000-9,999 (FINC4)	163	15.6
6. $10,000-14,999 (FINC5)	238	22.8
7. > $15,000 (FINC6)	197	18.9
Missing data	335	32.1
Total	1,045	100.0

TABLE 4.2 (CONT'D)
SELECTED FREQENCIES

Post-secondary Support	Frequency	Per Cent
1. < $1,000 (PSS1)	73	7.0
2. $1,000-3,999 (PSSC2)	91	8.7
3. $4,000-7,999 (PSSC3)	127	12.2
4. > $8,000 (PSSC4)	651	62.3
Missing data	103	9.9
Total	1,045	100.0

TABLE 4.3

ANALYSIS 1 - FINAL STEP

SUMMARY STATISTICS

DEPENDENT VARIABLE : EMPLOYMENT STATUS

Step of Regression Procedure	Independent Variable	Multiple R^2	Change in R^2	Zero Order r	B (t values)	Beta
1.	YRSW	0.03039	0.03039	0.17432	0.00999 (2.97315)*	0.18186
2.	AFM	0.03772	0.00733	0.12594	0.01316 (2.15772)*	0.17728
3.	AFB	0.04204	0.00432	0.07172	-0.00463 (-0.83519)	-0.07977
4.	MSTAT	0.04516	0.00313	0.03109	0.08024 (0.82643)	0.04595
5.	PSSC2	0.04798	0.00281	0.04199	0.04544 (1.10877)	0.06169
6.	FINC5	0.05072	0.00275	0.04671	0.01220 (0.37049)	0.02550
7.	RAGE	0.05236	0.00164	0.03912	-0.00274 (-0.96549)	-0.11435
8.	LC2	0.05428	0.00193	-0.05718	-0.02014 (-0.40652)	-0.03951

TABLE 4.3 (CONT'D)

ANALYSIS 1 - FINAL STEP

SUMMARY STATISTICS

DEPENDENT VARIABLE : EMPLOYMENT STATUS

Step of Regression Procedure	Independent Variable	Multiple R^2	Change in R^2	Zero Order r	B (t values)	Beta
9.	EDR1	0.05547	0.00119	0.00554	0.00979 (0.16657)	0.01297
10.	PSSC3	0.05657	0.00110	-0.05120	-0.02475 (-0.66113)	-0.03624
11.	EDR3	0.05737	0.00080	-0.01422	-0.03803 (-0.81522)	-0.07184
12.	EDR2	0.05877	0.00140	-0.01970	-0.02414 (-0.53237)	-0.05322
13.	FINC2	0.05948	0.00071	-0.04435	-0.04579 (-0.63363)	-0.03677
14.	FINC3	0.06009	0.00061	-0.03643	-0.02820 (-0.56858)	-0.03736
15.	FINC1	0.06048	0.00039	-0.03824	-0.04129 (-0.50016)	-0.02884
16.	AFS	0.06098	0.00051	0.02023	0.00422 (0.40527)	0.03006

TABLE 4.3 (CONT'D)

ANALYSIS 1 - FINAL STEP

SUMMARY STATISTICS

DEPENDENT VARIABLE : EMPLOYMENT STATUS

Step of Regression Procedure	Independent Variable	Multiple R^2	Change in R^2	Zero Order r	B (t values)	Beta
17.	PSSC1	0.06118	0.00020	-0.02082	-0.01171 (-0.25055)	-0.01379
18.	FINC4	0.06134	0.00015	-0.02598	-0.00938 (-0.25623)	-0.01828
19.	LC3	0.06140	0.00006	0.05738	0.00603 (0.15123)	0.01108
	Constant				-0.12296	

Degree of Freedom for F Ratio : 19, 336

F-value : 1.15683 not significant at 0.05 level

Note: * = t values significant at 0.05 level

variance explained. (Change in R^2 = 0.00733).

Figure 4.2 presents the direction of relationships and the beta coefficients of the nineteen variables. Beta coefficients are used because they show the standardized effects of the individual variables when the effects of the other variables are controlled.

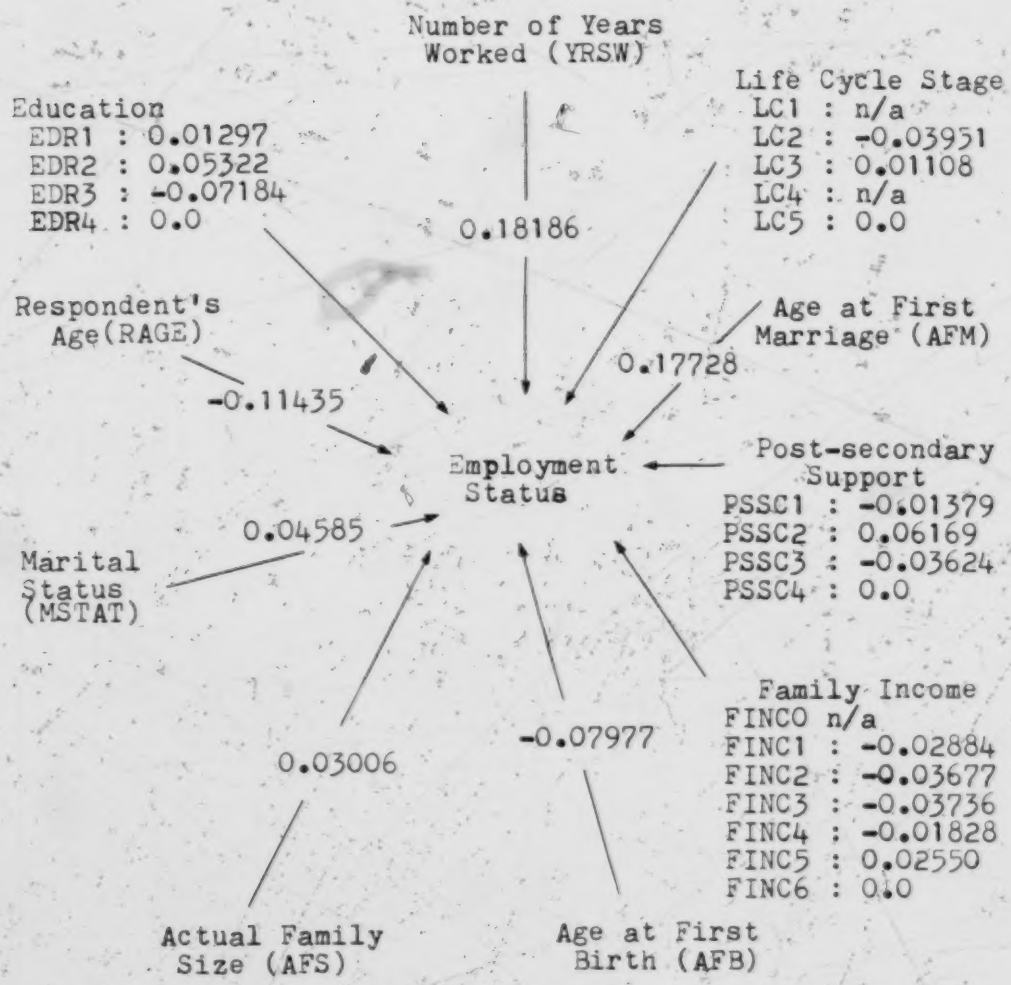
Comparison with Figure 4.1 shows that number of years worked and age at first marriage follow the direction of the hypothesized relationships. That is, work experience as indicated by number of years worked, is positively related to employment (beta = 0.16186). Age at first marriage with a beta coefficient of 0.17728 is positively associated with employment as hypothesized. This confirms the hypotheses that the more the work experience, and the later a woman's marriage, the more likely that she is employed.

Actual family size (AFS) takes up a positive relationship as opposed to the hypothesized negative relationship with employment status (beta = 0.03006). This implies that women with a larger family size are more likely to be employed. Marital status (MSTAT) with a beta coefficient of 0.04581 is positively associated with employment status, different to the expected negative association. This implies that women married or living with someone are more likely to be employed than other marital status groups. Respondent's age (RAGE) (beta= -0.11435) shows that younger women are

FIGURE 4.2

BETA COEFFICIENTS

DEPENDENT VARIABLE - EMPLOYMENT STATUS



more likely to be employed. Age at first birth (AFB) (beta = - 0.07977) shows that the earlier a woman has her first birth, the more likely she is employed. These latter two variables exhibit causal directions different from the hypothesized relationships.

The direction of relationship of the variables education, life cycle stage, post-secondary support and family income with employment status vary somewhat from the hypothesized relationships and are not strictly linear. Their beta coefficients are shown graphically in Figure 4.3 for a better understanding.

Among the educational groups, it appears that the group least likely to be participating in the labour force is the group with post-secondary school training but no university (EDR3). The groups with less than 8 years (EDR1) and some university (EDR4) are most likely to be employed.

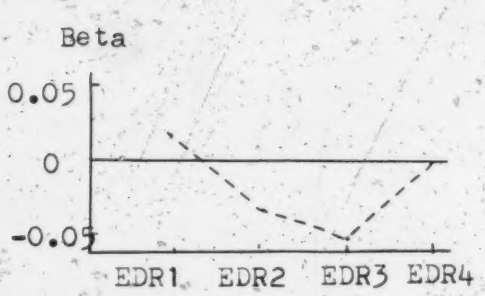
Among the life cycle groups, women in the second life cycle (LC2) - with children less than 6 years of age, are least likely to be employed. This direction is as hypothesized earlier. However, women in the next stage (LC3)- with children both above and below age 6, are as likely to be employed as those in life cycle stage 5 (LC5) - when all children are over 18 years old. Beta coefficients for life cycle 1 (LC1) - no children, and life cycle 4 (LC4) - children over 6 years old are not available due to the small sample size. To supplement this deficiency,

FIGURE 4.3

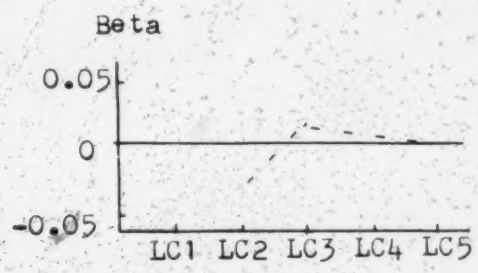
ANALYSIS 1 - FINAL STEP

DISTRIBUTION OF BETA COEFFICIENTS AMONG SETS OF DUMMY VARIABLES

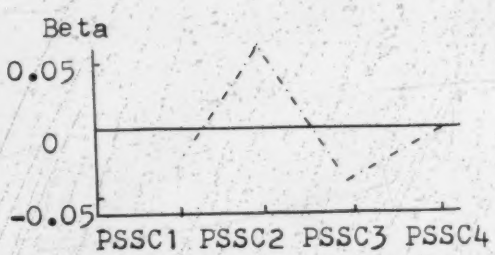
Dependent Variable: Employment Status



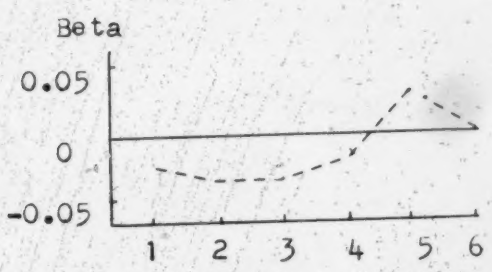
EDUCATION



LIFE CYCLE STAGE



POST - SECONDARY SUPPORT



FAMILY INCOME

a table showing the relationship between life cycle stage and employment status is prepared for the survey sample of 1045 respondents (Table 4.4). It is shown that 2.4 per cent of respondents in life cycle 1 are employed and 36.0 per cent are not employed. In life cycle 4 3.9 per cent of respondents are employed and 65.0 per cent are not employed. The high proportion of missing values in these two categories has reduced the number of valid cases for the regression, resulting in the insignificance of the relationship.

Among post-secondary support groups, the group most likely to be employed is the group indicating $1,000 to $3,999 support (PSSC2) including room and board for 3 or more years, or 2 years, or full support for one year of post-secondary education. The first group (PSSC1) - less than $1,000 support, and the third group (PSSC3) - $4,000 to $7.999 support are the least likely to be employed. The direction of relationship is clearly non-linear.

Family income bears a somewhat negative effect on employment for the first three groups (FINC1 to FINC3) when annual family income are (1) under $3,000, (2) $2,000 - 4,999 and (3) $5,000 - 6,999. It takes up an ascending order from FINC3 ($5.000 to 6,999) through FINC5 ($10,000 - $ 14,999) and is positively related to employment in the FINC5 group. Although the relationship is not directly linear as hypothesized, it confirms our conjecture that family income, as an indicator of the desire to maintain or improve one's life

TABLE 4.4

LIFE CYCLE STAGE BY EMPLOYMENT STATUS

WITH ROW PERCENTAGES

Life Cycle Stage	Employment Status: Not Employed	Employed	Missing	Total
1. No child (LC1)	121 36.0%	8 2.4%	207 61.6%	336 100.0%
2. Child < 6 (LC2)	127 70.9%	4 2.2%	48 26.8%	179 100.0%
3. Child <> 6 (LC3)	113 81.3%	6 4.3%	20 14.4%	139 100.0%
4. Child > 6 (LC4)	215 65.0%	13 3.9%	103 31.3%	331 100.0%
5. Child > 18 (LC5)	27 45.0%	1 1.7%	32 53.3%	60 100.0%
Total	603 57.7%	32 3.1%	410 39.2%	1,045 100.0%

style, is positively related to female employment, particularly for the higher income groups.[1]

Of the nineteen variables used, age at first marriage is highly correlated with age at first birth (zero order correlated coefficient = 0.71529). There is clearly a risk of multicollinearity. The overall F statistics (1.15683) for the final step indicates that the regression equation is not significant at the 0.05 level. The resulting regression equation is thus not the best prediction equation. A check with earlier steps in the stepwise regression analysis provides us with two alternative regression equations that are significant.

Step two of the stepwise regression series involves two variables; number of years worked and age at first marriage. This regression excludes the variable age at first birth - third variable in importance. Since age at first marriage and age at first birth are highly correlated, the exclusion of age at first birth eliminates the problem of multicollinearity which may result in biased regression estimates. The summary statistics are presented in Table 4.5. The overall F statistic (6.91836) is significant at the 0.01 level, and number of years worked (t = 2.83074) is significant at the 0.05 level. This step reduces the number of significant variables to one instead of two in the final step. Total variance explained is 3.77 per cent (R^2 = 0.03772).

Step three of the stepwise regression series adds

TABLE 4.5

ANALYSIS 1 - STEP 2

SUMMARY STATISTICS

DEPENDENT VARIABLE : EMPLOYMENT STATUS

Independent Variable	Multiple R^2	Change in R^2	Zero Order r	B (t values)	Beta
YRSW	0.03039	0.03039	0.17432	0.00838 (2.83074)*	0.15255
AFM	0.03772	0.00733	0.12594	0.00656 (1.63975)	0.08835
Constant				-0.11965	

Degree of Freedom for F Ratio : 2, 395

F-value : 6.91838 significant at 0.05 level

Note: * = t values significant at 0.05 level

one more variable to the equation (Table 4.6). This variable is age at first marriage. In spite of a risk of multicollinearity and unknown bias, the regression equation is significant at the 0.05 level (F =5.14884), and the number of significant variables is increased to two, namely, number of years worked (t = 3.30098) and age at first marriage (t = 2.05703). Total variance explained is 4.2 per cent (R^2 = 0.04204). The regression equation is as follows:

$$Y = @ + B_1X_1 + B_2X_2 + B_3X_3$$

$$= -0.09461 + 0.00935\ X_1 + 0.01139\ X_2 - 0.0564\ X_3$$

where @ = constant
Y = employment status
X_1 = number of years worked
X_2 = age at first marriage
X_3 = age at first birth
B_i = regression coefficient

Figure 4.4 shows the direction of relationship of the beta coefficients of the significant variables number of years worked and age at first marriage in this regression analysis.

4.3 Conclusion on Analysis 1

This analysis examines the effects of nineteen variables on the employment status of women in all life cycle groups. Number of years worked and age at first marriage are significantly related to employment status and the direction of their effects are as hypothesized, that is,

TABLE 4.6

ANALYSIS 1 - STEP 3

SUMMARY STATISTICS

DEPENDENT VARIABLE : EMPLOYMENT STATUS

Independent Variable	Multiple R^2	Change in R^2	Zero Order r	B (t values)	Beta
RSW	0.03039	0.03039	0.17432	0.00935 (3.50098)*	0.17023
AFM	0.03772	0.00733	0.12594	0.01139 (2.05703)*	0.15350
AFB	0.04204	0.00432	0.07172	-0.00564 (-1.26085)	-0.09718
Constant				-0.09461	

Degree of Freedom for F Ratio : 3, 352

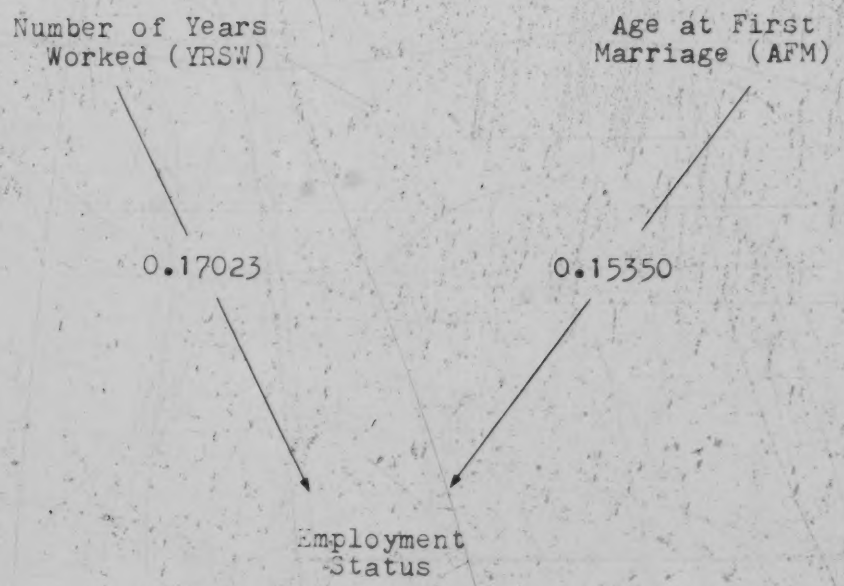
F-value : 5.14884 significant at 0.01 level

Note : * - t values significant st 0.05 level

FIGURE 4.4

BETA COEFFICIENTS FOR VARIABLES SIGNIFICANTLY ASSOCIATED WITH EMPLOYMENT STATUS

(ANALYSIS 1 - STEP 3)



positively related to employment. The effects of the other variables are mixed and not as hypothesized. Effects of education and post-secondary support are not linear and therefore not as expected.

Relationships of the variables can be summarized as follows. Number of years worked, age at first marriage, actual family size, marital status are positively related to employment. Age at first birth and respondent's age are negatively related to employment. Education bears a u-shaped relationship in which women with the least educational attainment and the most educational attainment are most likely to be employed. The relationship between family income and female labour force participation is as hypothesized for the higher income groups. Women in these higher family income groups are more likely to be employed. In the lower family income groups, those in the lowest group (FINC1) are slightly more likely to be employed than the others. Post-secondary support is prominently and positively related to employment among the second group (PSSC2) when support is between $1,000 and $3,999. Among the life cycle groups, the least likely to be employed is life cycle stage 2 (LC2) - when children are under 6, as hypothesized. The most likely employed groups are life cycle stage 3 (LC3) - when children are both above and below 6 years of age, and life cycle stage 5 (LC5) - when children are over 18.

The regression equation with the best predictive

power is taken from step three of the stepwise regression series, when number of years worked and age at first marriage are both significant.[2] A risk of multicollinearity is noted since the third variable in the equation, age at first birth, is highly correlated with age at first marriage (r = 0.71529). Alternatively, the regression equation from step two can be used with one significant variable, namely, number of years worked. Age at first birth is not included and the risk of multicollinearity is avoided.

To conclude, the analysis shows that fertility and life cycle stages have insignificant effects in predicting female labour force participation, although their explanatory contributions can be roughly established. Of the background variables, number of years worked and age at first marriage are the two important variables that explain most of the variance and are significant in predicting female labour force participation.

Footnotes : 1) The importance of family income has been stressed by Liebenstein and inferred by Becker.

2) The current study does not show high correlation between late marriage and work experience although theoretically such causal relationship is likely.

CHAPTER 5

FEMALE LABOUR FORCE PARTICIPATION AT LIFE CYCLE STAGES 1 TO 2

This chapter presents the results of a series of stepwise regression analyses geared to exploring the associations between the independent variables, which include fertility and other socio-economic variables, and the employment status of women at different life cycle stages. Five analyses (Analyses 2 to 6) are presented. Each analysis attempts to establish a pattern of associations and to depict the variables most important in predicting the dependent variable. The background variables used in Analysis 2 are the same as those employed in Analysis 1 in Chapter 4. Analyses 3 to 6 incorporate the variable average interval between births (AIB) which is expected to have a positive relationship with the dependent variables employment status at life cycle stages 2 to 5 (D2 to D5). The variable interval between births (AIB) is not used in Analysis 2 because the dependent variable life cycle stage 1 (D1) consists of women who have no children. The variable interval between births (AIB) is not applicable in this instance.

The procedures of analysis in this chapter follow

CHAPTER 5

FEMALE LABOUR FORCE PARTICIPATION AT LIFE CYCLE STAGES 1 TO 5

This chapter presents the results of a series of stepwise regression analyses geared to exploring the associations between the independent variables, which include fertility and other socio-economic variables, and the employment status of women at different life cycle stages. Five analyses (Analyses 2 to 6) are presented. Each analysis attempts to establish a pattern of associations and to depict the variables most important in predicting the dependent variable. The background variables used in Analysis 2 are the same as those employed in Analysis 1 in Chapter 4. Analyses 3 to 6 incorporate the variable average interval between births (AIB) which is expected to have a positive relationship with the dependent variables employment status at life cycle stages 2 to 5 (D2 to D5). The variable interval between births (AIB) is not used in Analysis 2 because the dependent variable life cycle stage 1 (D1) consists of women who have no children. The variable interval between births (AIB) is not applicable in this instance.

The procedures of analysis in this chapter follow

closely the format employed in Chapter 4. Each analysis will be presented separately. At first, the number of cases, the means and other characteristics of the sample studied are presented. Secondly, a search for the best prediction equation in terms of the highest number of significant variables and overall statistical significance will be undertaken. Different from Chapter 4, only the essential tables and figures showing the final results of the analyses will be presented in this chapter. Table 5.1 summarizes the variables and the variance explained from the regression analyses.

5.1 Hypothesized Relationships

Figure 5.1 shows the hypothesized relationships between the independent variables and the dependent variables. The directions of relationships are expected to be the same through Analyses 2 to 6. The magnitude of the relationships are expected to be somewhat different in each analysis due to sample differences in socio-economic characteristics among the life cycle groups. The rationale for the expected relationships between the independent variables and the dependent variable is the same as discussed in Chapter 4 and will not be repeated here. The variable which has not been discussed earlier is average interval between births. It is expected to be positively related to employment. It is speculated that the closer together the childbirth

TABLE 5.1

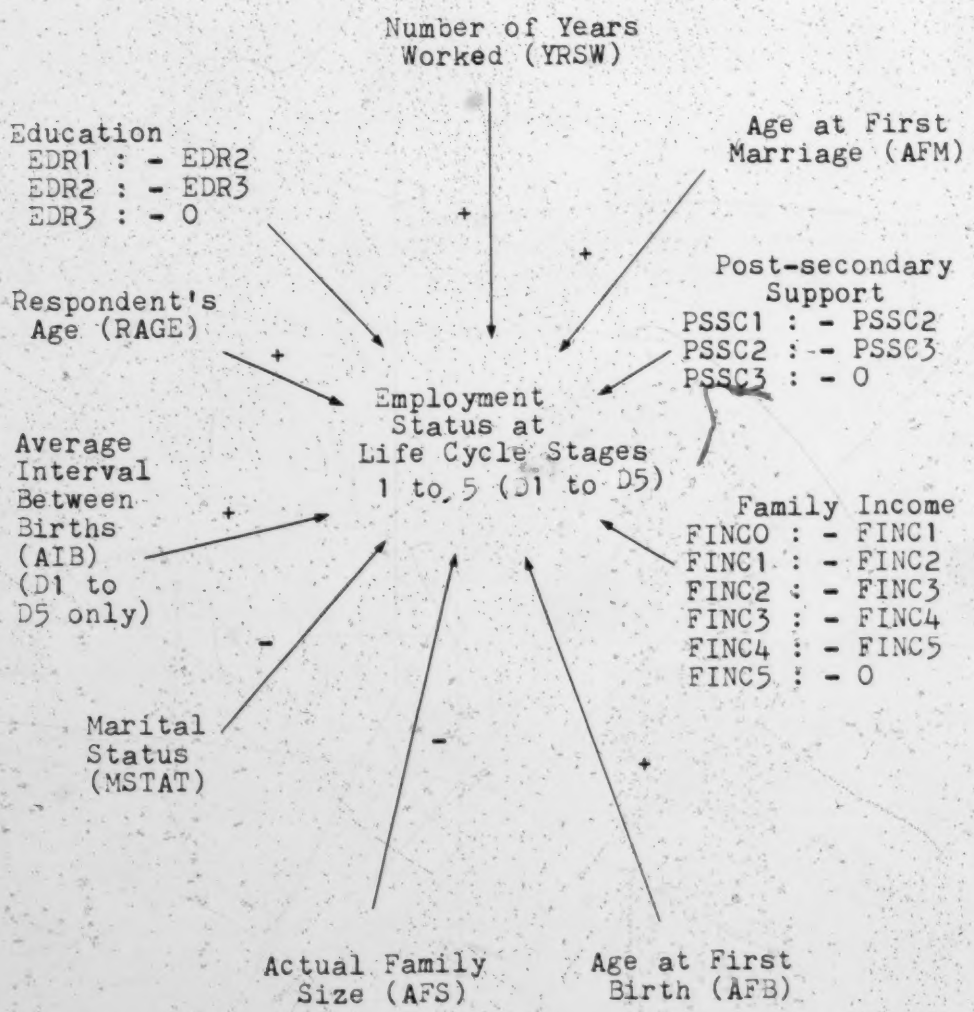
SUMMARY OBSERVATIONS OF VARIABLES USED IN MULTIPLE REGRESSION ANALYSIS

Dependent Variable	Analysis 1	2	3	4	5	6
Life Cycle Stage	1-5	1	2	3	4	5
Independent Variable						
Mean age of respondent	35.1	27.3	25.8	32.0	40.9	49.8
Mean number of years worked	4.3	4.0	2.3	4.7	4.5	6.1
Mean age at first marriage	20.9	21.1	20.6	20.9	21.1	20.8
Mean age at first birth	23.1	-	22.8	22.3	23.3	23.1
Mean actual family size	2.8	-	2.1	3.3	3.5	2.9
Mean birth interval	-	-	3.1	3.1	3.0	3.3
Employed/unemployed	32/603	8/121	4/127	6/131	13/215	1/27
Variance explained by R^{2*}	29.9%	25.7%	42.6%	31.6%	3.9%	23.5%

Note: * R^2 from selected regression equations only

FIGURE 5.1

HYPOTHESIZED RELATIONSHIPS BETWEEN INDEPENDENT VARIABLES AND EMPLOYMENT STATUS AT LIFE CYCLE STAGES 1 TO 5



interval, the less likely it would be for the woman to leave home to work, and the more likely she would devote herself to childcare responsibilities. Since she would have little time for employment related activities, her earnings potential and human capital investment in terms of work experience and education will likely deteriorate. Average interval between births is thus expected to be positively related to employment since women who have longer childbirth intervals would have retained more of their earnings potentials by participating in the labour force between births, have more work experience and better chances of finding satisfactory employment.

5.2 Results of Analysis 2

This analysis examines the effects of the independent variables on the dependent variable employment status of women at life cycle stage 1 (D1) - when they have no children. Altogether 57 cases are examined. The mean for the dependent variable employment status of women in life cycle 1 is 0.0702, which is slightly higher than the mean for women in all life cycles reported in Analysis 1 (0.0534). The mean age of respondents in this study is 27.3 years, average number of years worked 4.0, and mean age at first marriage is 21.1. The mean of the dummy variable sets on education (EDR1 to EDR3), family income (FINCO to FINC5) and post-secondary support (PSSC1 to PSSC3) varied. Table 5.2 presents the

TABLE 5.2

ANALYSIS 2 - SAMPLE CHARACTERISTICS

	Employment Status at Life Cycle Stage 1		
Education	Not Employed	Employed	Total
1. 0-8 years (EDR1)	8	0	8
2. 9-13 years (EDR2)	37	5	42
3. Post-secondary (EDR3)	21	2	23
4. Some university (EDR4)	55	1	56
Missing data	0	0	0
Total	121	8	129
Family Income			
1. Nil (FINC0)	1	0	1
2. < $3,000 (FINC1)	2	0	2
3. $3,000-4,999(FINC2)	6	0	6
4. $5,000-6,999(FINC3)	13	2	15
5. $7,000-9,999(FINC4)	13	0	13
6. $10,000-14,000(FINC5)	13	5	18
7. > $15,000 (FINC6)	16	0	16
Missing data	57	1	58
Total	121	8	129
Post-secondary Support			
1. < $1,000 (PSSC1)	8	0	8
2. $1,000-3,999 (PSSC2)	9	1	10
3. $4,000-7,999 (PSSC3)	15	0	15
4. > $8,000 (PSSC4)	72	4	76
Missing data	17	3	20
Total	121	8	129

distributions of these variables including the control categories.

Education and employment status at life cycle 1 reveal interesting relationships. A high proportion (12%) of women at education 2 - 9 to 13 years are employed, compared to 9 per cent of those with post-secondary education and only 0.5 per cent of those with some university education. Among income groups there are higher incidences of female employment among family income group 3 ($5,000 - 6,999) - 13 per cent, and family income group 5 ($10,000 - 14,999) - 27 per cent. Female employment status by extent of post-secondary support shows that 10 per cent of group 2 ($1,000 - 3,999) and 0.5 per cent of group 4 ($8,000) are employed. It is evident that the small proportion (5 per cent) of employed women among survey respondents in life cycle stage 1 contributes significantly to the above findings.

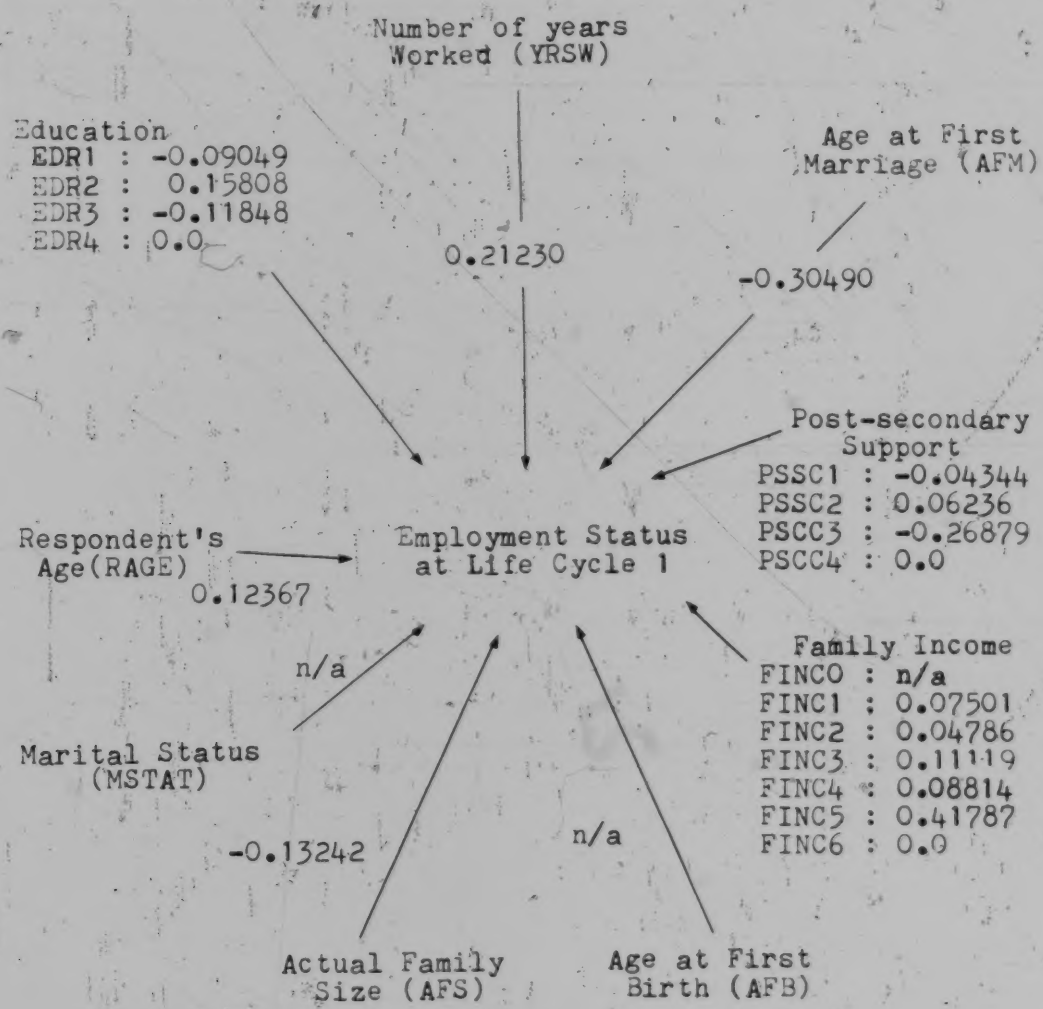
In the final step of the regression analysis, fifteen variables are used in the regression equation. Total variance explained is 33.2 per cent ($R^2 = 0.33179$). The beta coefficients and the direction of relationships are shown in Figure 5.2. Beta coefficients for age at first birth (AFB) and marital status are not available. The directions of most relationships are as hypothesized : number of years worked - positive, and respondent's age - positive. Results of the dummy variable sets education, family income and post-secondary support are mixed and do not present

FIGURE 5.2

ANALYSIS 2 - FINAL STEP

BETA COEFFICIENTS

DEPENDENT VARIABLE: EMPLOYMENT STATUS AT LIFE CYCLE STAGE 1



clearly ascending relationships as hypothesized (Figure 5.3). Beta coefficients for education show higher incidences of employment for category 2 (EDR2) and category 4 (EDR4). Family income shows highest employment for group 5 (FINC5) and lowest for group 6 (FINC6). Post-secondary support shows highest employment for group 4 (PSSC4) and lowest for group 3 (PSSC3). These relationships are not as hypothesized but are consistent with the characteristics of the sample shown earlier in Table 5.1.

In the final step only one variable, namely, family income category 5 (FINC5) has significant t values (t = 2.28964). The variance explained by this variable is 19.3 per cent (R^2 = 0.19340). In regression step 5, however, three significant variables are detected (Table 5.3). These are family income category 5 (FINC5), education category 2 (EDR2) and post-secondary support group 3 (PSSC3), each explaining 19.3 per cent, 3.1 per cent and 3.0 per cent of the variance respectively. The total variance explained by this regression step is 29.9 per cent (R^2 = 0.29944). This step provides the best regression equation for predicting female employment status at life cycle stage 1:

$$Y = @ + B_1X_1 + B_2X_2 + B_3X_3 + B_4X_4 + B_5X_5$$

$$= 0.28394 + 0.16676X_1 + 0.12311X_2 - 0.17310X_3 - 0.01625X_4 + 0.01258X_5$$

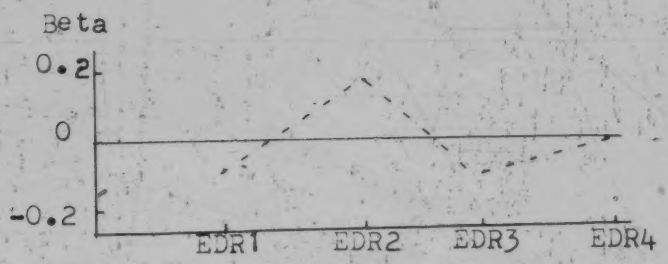
where @ = constant

FIGURE 5.3

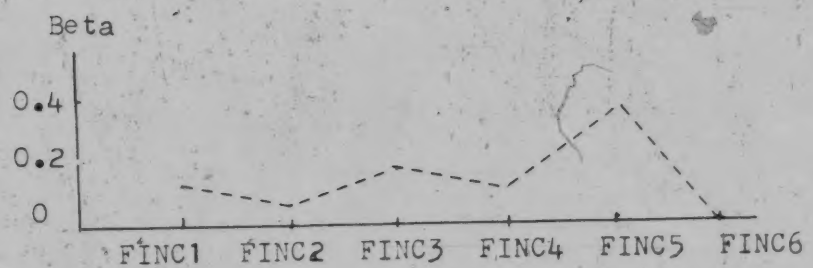
ANALYSIS 2 - FINAL STEP

DISTRIBUTION OF BETA COEFFICIENTS AMONG SETS OF DUMMY VARIABLES

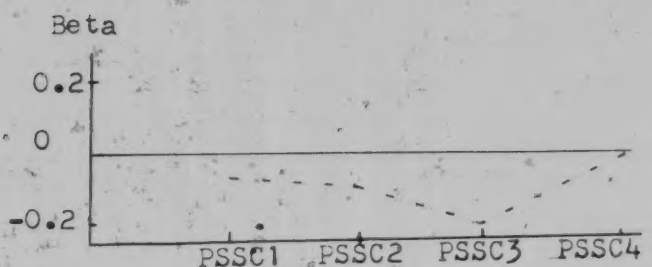
Dependent Variable :
Employment Status at Life Cycle Stage 1



EDUCATION



FAMILY INCOME



POST-SECONDARY SUPPORT

TABLE 5.3

ANALYSIS 2 - STEP 5

SUMMARY STATISTICS

DEPENDENT VARIABLE: EMPLOYMENT STATUS AT LIFE CYCLE STAGE 1

Independent Variable	Multiple R^2	Change in R^2	Zero Order r	B (t values)	Beta
FINC5	0.19340	0.19340	0.43977	0.16676 (2.25510)*	0.29335
EDR2	0.22477	0.03138	0.27958	0.12511 (1.84690)*	0.24094
PSSC3	0.25440	0.02962	-0.11896	-0.17310 (-1.88090)*	-0.24710
AFM	0.26631	0.01192	-0.19776	-0.01625 (-1.59965)	-0.23337
YRSW	0.29944	0.03313	0.12868	0.01258 (1.55267)	0.21391
Constant				0.28394	

Degree of Freedom for F Ratio : 5, 51
F-value : 4.35977 significant at 0.01 level

Note: * = t values significant at 0.05 level

Y_1 = employment status at life cycle stage 1
X_1 = family income group 5 viz $10,000-14,999
X_2 = education category 2 viz 9 -13 years
X_3 = post-secondary support group 3 viz $4,000-7,999
X_4 = age at first marriage
X_5 = number of years worked

5.3 Conclusion on Analysis 2

The findings of this analysis show that the relationships of two independent variables with the dependent variable employment status at life cycle stage 1 (D1) are as hypothesized. Namely, number of years worked and respondent's age are positively related to the dependent variable. Age at first marriage is negatively related to the dependent variable. The effects of the variables age at first birth and marital status cannot be assessed because beta coefficients cannot be computed. Education, family income and post-secondary support do not show ascending relationships as hypothesized but the magnitudes of the beta coefficients are consistent with sample characteristics.

The best prediction equation consists of five variables. The significant variables are family income group 5 ($10,000 - 14,999), education category 2 (9 to 13 years) and post-secondary support group 3 ($4,000 to 7,999).

5.4 Results of Analysis 3

The dependent variable in this analysis is employment status of women at life cycle stage 2 (D2) - when children

are under 6 years of age. Altogether 35 cases are included in the stepwise regression analysis. The mean for the dependent variable employment status at life cycle 2 is 0.0571 which is lower than the mean reported for employment status at life cycle 1 (0.0702) in the previous analysis. The mean age of respondents is younger, at 25.8 years (27.3 years for life cycle stage 1). The mean number of years worked is 2.3 years (4.0 years for life cycle stage 1) and the mean age at first marriage is 20.6 (21.1 for life cycle stage 1). The mean age at first birth is 22.8 years. The mean actual family size is 2.1 children, and the mean average interval between births is 2.1 years.

Distributions for education, family income and post-education support by employment status at life cycle stage 2 are shown in Table 5.4. One must note that the number of employed women in life cycle stage 2 is very small and constitutes only about 3 per cent of the 131 respondents in life cycle stage 2.

In the final step of the stepwise regression analysis eighteen variables are used. Total variance explained is 42.6 per cent (R^2 = 0.42566). However, none of the variables shows a significant relationship with the depedent variable. Figure 5.4 shows the beta coefficients generated in this analysis. The direction of relationships of most of the variables are as hypothesized: number of years worked - positive, age at first birth - negative, average interval between births - positive, and, respondent's age - positive.

TABLE 5.4

ANALYSIS 3 - SAMPLE CHARACTERISTCS

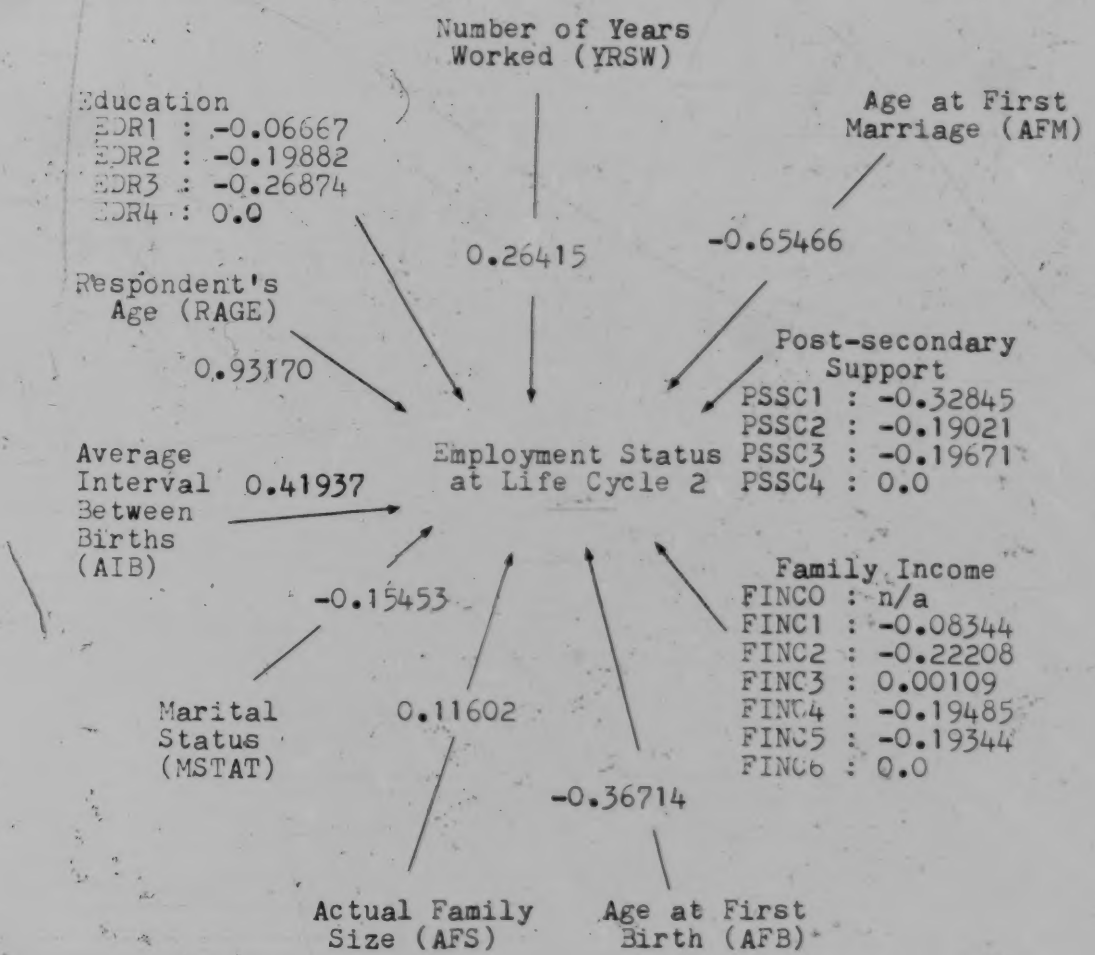
	Employment Status at Life Cycle Stage 2		
Education	Not Employed	Employed	Total
1. 0-8 years (EDR1)	6	0	6
2. 9-13 years (EDR2)	87	1	88
3. Post-secondary (EDR3)	23	2	25
4. Some university (EDR4)	11	1	12
Missing data	0	0	0
Total	127	4	131
Family Income			
1. Nil (FINC0)	0	0	0
2. < $3,000 (FINC1)	4	0	4
3. $3,000-4,999(FINC2)	6	0	6
4. $5,000-6,999(FINC3)	14	0	14
5. $7,000-9,999(FINC4)	35	1	36
6. $10,000-14,999(FINC5)	27	1	28
7. > $15,000 (FINC6)	12	2	14
Missing data	29	0	29
Total	127	4	131
Post-secondary Support			
1. < $1,000 (PSSC1)	9	0	9
2. $1,000-3,999 (PSSC2)	14	0	14
3. $4,000-7,999 (PSSC3)	22	0	22
4. > $8,000 (PSSC4)	72	3	75
Missing data	12	1	11
Total	127	4	131

FIGURE 5.4

ANALYSIS 3 - FINAL STEP

BETA COEFFICIENTS

DEPENDENT VARIABLE: EMPLOYMENT STATUS AT LIFE CYCLE STAGE 2



Actual family size is found to be positively related to employment status opposite to the hypothesized negative relationship. Age at first marriage and marital status are negatively related to the dependent variable and are not as hypothesized.

Beta coefficients for the dummy variables education, family income and post-secondary support are presented graphically in Figure 5.5. Education is found to have a U-shaped influence on employment status in life cycle stage 2 in that the lowest (0 to 9 years) and the highest groups (some university) are more likely to be employed. This finding is similar to the finding in Analysis 1 when employment status for women of all life cycle stages are examined. Family income shows a non-linear relationship which depicts higher female employment at the middle group FINC3 (35,000 to 6,999) and the highest group FINC6 (>$15,000). Post-secondary support bears a somewhat ascending relationship as hypothesized, showing increasing employment commitment as amount of intended post-secondary support increases.

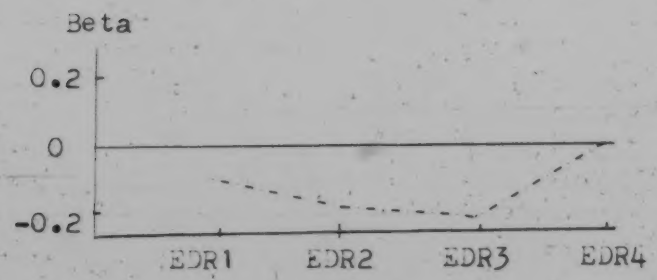
The zero-order correlation coefficients among three independent variables suggest high inter-correlations. Respondent's age is highly correlated with age at first birth (r = 0.94510) and with age at first marriage (r = 0.85414). Age at first birth is highly correlated with age at first marriage (r = 0.81941). The risk of multicollinearity can be avoided by selecting the regression

FIGURE 5.5

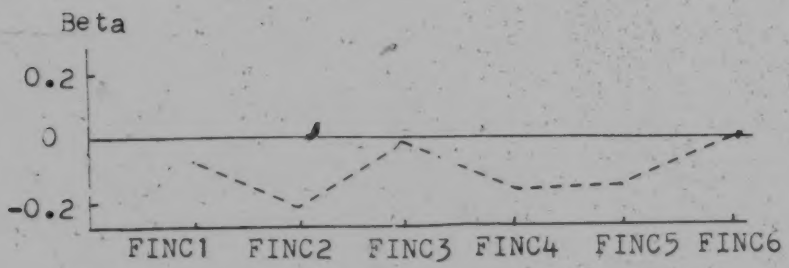
ANALYSIS 3 - FINAL STEP

DISTRIBUTION OF BETA COEFFICIENTS AMONG SETS OF DUMMY VARIABLES

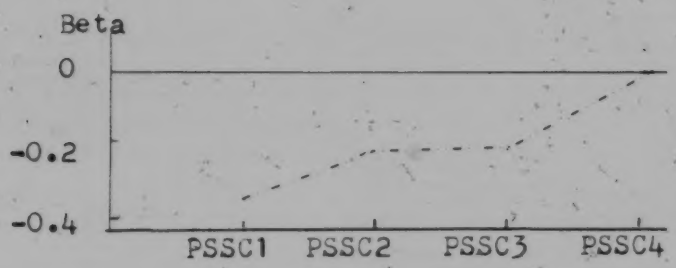
Dependent Variable :
Employment Status at Life Cycle Stage 2



EDUCATION



FAMILY INCOME



POST-SECONDARY SUPPORT

step that does not include more than one of these three variables in the regression equation. Step 4 appears to be the best regression analysis for prediction purposes. Actual family size (AFS) and average interval between births (AIB) are significant with t values = 2.24489 and 1.90456 respectively. Respondent's age (RAGE) and education category 1, viz 0 to 8 years (EDR1) are the other variables in the regression equation which have no significant t values. Actual family size explains 8.9 per cent of the variance (R^2 = 0.08908). Average interval between births adds 7.1 per cent to the amount of variance explained (R^2 change = 0.07108). The total amount of variance explained in this step is 25.7 per cent (R^2 = 0.25714). The regression equation reads as follows:

$$Y = @ + B_1X_1 + B_2X_2 + B_3X_3 + B_4X_4$$

$$= -1.01931 + 0.29444X_1 + 0.06373X_2 + 0.01301X_3 - 0.22642X_4$$

where @ = constant

Y = employment status at life cycle stage 2

X_1 = actual family size

X_2 = average interval between births

X_3 = respondent's age

X_4 = education category 1, viz 0-8 years

TABLE 5.5

ANALYSIS 3 - STEP 4

SUMMARY STATISTICS

DEPENDENT VARIABLE : EMPLOYMENT STATUS AT LIFE CYCLE STAGE 2

Independent Variable	Multiple R^2	Change in R^2	Zero Order r	B (t values)	Beta
AFS	0.08908	0.08908	0.29846	0.29444 (2.24485)*	0.40358
AIB	0.16015	0.07108	0.17408	0.06373 (1.98458)*	0.33572
RAGE	0.21305	0.05290	0.28989	0.01301 (1.36663)	0.22380
EDR1	0.25714	0.04409	-0.06061	-0.22642 (-1.33432)	-0.22642
Constant				-1.01931	

Degree of Freedom for F Ratio : 4, 30

F-value : 2.59615 not significant at 0.05 level

Note: * = t values significant at 0.05 level

5.5 Conclusion on Analysis 3

The results of this analysis show that the directions of relationship of five independent variables are as hypothesized. These are : number of years worked - positive, marital status - negative, average interval between births - positive, respondent's age - positive, and post-secondary support - ascending. Actual family size is positively related to the dependent variable and age at first marriage and age at first birth - negative, are not as hypotnesized. Education and family income do not follow a clear ascending pattern but the magnitude of association is consistent with direct observations on sample characteristics.

Step 4 is chosen to be the prediction equation among the eighteen steps. Actual family size and average interval between births are the most important variables in predicting employment status in life cycle stage 2 - when children are under 6 years old. This finding is difficult to interpret because it suggests that among women whose children are young, those with a large family size and with a longer average birth interval are more likely to be participating in the labour force. This difficulty is caused by the small size of the sample. One should consider that in the specific sample examined 25 per cent of employed respondents in the life cycle belong to the nighest parity group observed - family size of three children (Table 5.6). It supports the observation that

TABLE 5.6

ACTUAL FAMILY SIZE BY EMPLOYMENT STATUS AT LIFE CYCLE STAGE 2

Actual Family Size	Employment Status at Life Cycle Stage 2		
	Not Employed	Employed	Total
0	0	0	0
1	81	2	83
2	41	1	42
3	5	1	6
4	0	0	0
5	0	0	0
6+	0	0	0
Total	127	4	131

actual family size is found to be positively related to employment status at life cycle stage 2 instead of the hypothesized negative relationship.

5.6 Results of Analysis 4

Analysis 4 examines the associations of the independent variables on the dependent variable employment status of women at life cycle stage 3 (D3) - when children are both under 6 years and above 6 years of age. The number of cases examined is 77. The mean for the dependent variable employment status at life cycle stage 3 is 0.07779, which is closer to the mean for employment status at life cycle stage 1 (0.0702) and higher than the mean for employment status at life cycle stage 2 (0.0571). The mean age of respondents is older than the two earlier cycle groups at 32.0 years, compared with 27.3 years for life cycle stage 1 and 25.8 years for life cycle stage 2. The mean number of years worked is 4.7 years, higher than the two previous cycle groups (4.0 years for life cycle stage 1 and 2.3 years for life cycle stage 2). The mean age at first marriage is 20.9 (21.1 for life cycle stage 1 and 20.6 for life cycle stage 2). The mean actual family size is 3.3 children (2.1 for life cycle stage 2), and the mean age at first birth is 22.2 years, which is slightly lower than observed for life cycle stage 2 at 22.8 years. The mean average interval between births is 3.1 years (2.1 years for life cycle stage 2).

Observations for education, family income and post-secondary support by employment status at life cycle stage 3 are shown in Table 5.7. Figure 5.6 shows the beta coefficients from the final step of the regression analysis. Altogether sixteen variables are included in the regression analysis. Total variance explained is 33.2 per cent (R^2 = 0.33210). Three variables are of significance. Their order of importance in terms of amount of variance explained is : number of years worked (YRSW) 7.9 per cent (R^2 change = 0.07923), post-secondary support group 2 (PSSG2) - $1,000-3,999, an additional 5.6 per cent (R^2 change = 0.05565) and age at first marriage, another 2.7 per cent (R^2 change = 0.02730). The F statistic , 1.66458, is significant at the 0.05 level. Examination of the correlation matrix reveals no problem of multicollinearity.

The directions of relationships of the independent variables with the dependent variable : number of years worked - positive, age at first marriage - positive, actual family size - negative, average interval between births - positive and respondent's age - positive are as hypothesized. The effects of two variables, age at first birth - negative, and marital status - positive, are not as hypothesized.

Beta coefficients for the dummy variables education, family income and post-secondary support are shown graphically

TABLE 5.7

ANALYSIS 4 - SAMPLE CHARACTERISTICS

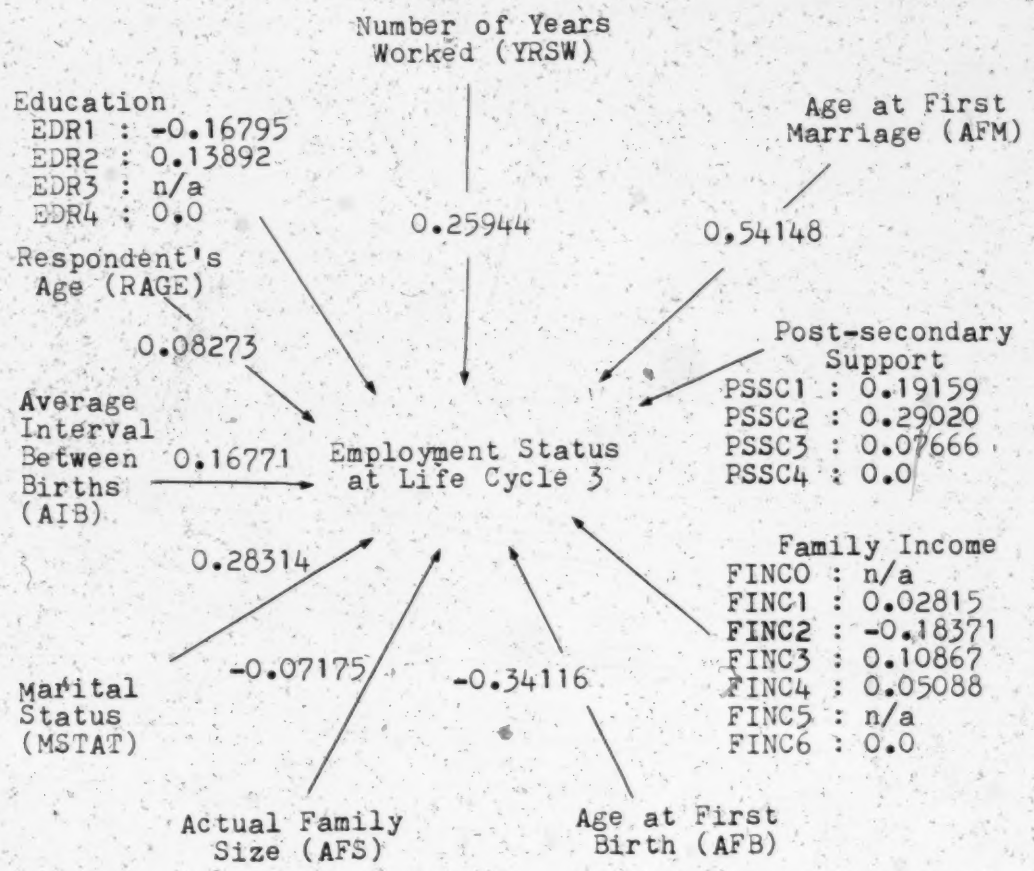
	Employment Status at Life Cycle Stage 3		
Education	Not Employed	Employed	Total
1. 0-8 years (EDR1)	11	0	11
2. 9-13 years (EDR2)	61	5	66
3. Post-secondary (EDR3)	30	1	31
4. Some university (EDR4)	11	0	11
Missing data	0	0	0
Total	113	6	119
Family Income			
1. Nil (FINC0)	0	0	0
2. < $3,000 (FINC1)	2	0	2
3. $3,000-4,999 (FINC2)	4	0	4
4. $5,000- 6,999 (FINC3)	11	1	12
5. $7,000-9,999 (FINC4)	25	2	27
6. $10,000-14,999 (FINC5)	26	3	29
7. > $15,000 (FINC6)	15	0	15
Missing data	30	0	30
Total	113	6	119
Post-secondary Support			
1. < $1,000 (PSSC1)	10	1	11
2. $1,000-3,999 (PSSC2)	3	1	4
3. $4,000-7,999 (PSSC3)	8	1	9
4. > $8,000 (PSSC4)	76	3	79
Missing data	16	0	16
Total	113	6	119

FIGURE 5.6

ANALYSIS 4 - FINAL STEP

BETA COEFFICIENTS

DEPENDENT VARIABLE: EMPLOYMENT STATUS AT LIFE CYCLE STAGE 3



in Figure 5.7. The directions of the relationships are mixed, almost ascending but not linearly ascending as hypothesized. Generally, they resemble sample characteristics as presented in Table 5.7. High probabilities for female employment status at life cycle stage 3 are suggested for earlier categories than the control actegories. This observation is true for all three variables education, family income and post-secondary support. Education reveals roughly inverted V-shaped indicating low participation among women in the lowest (0 - 8 years) education group, high participation in the second category (9 - 13 years) and medium participation among women with some university education (EDR4). Family income category 2 - $3,000 - 4,999 (FINC2) has the lowest beta coefficient among the six categories. Beta coefficients for the first, third and fourth groups are higher than the highest income group (FINC6). Post-secondary support reveals higher association with employment status in the lower support categories (PSSC1 and PSSC2). Beta coefficients for the higher support groups (PSCC3 and PSSC4) are lower in magnitude.

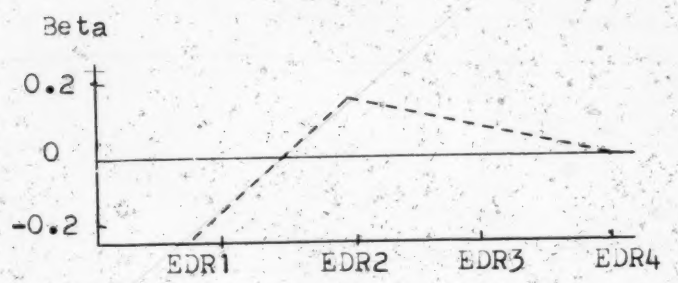
The best prediction equation is the regression equation for step 10 (Table 5.8) where three more significant variables are reported. The six significant variables are in the following order of importance : (1) number of years worked (R^2 = 0.07923), (2) post-secondary support category 2 - $1,000 to 3,999 ($R^2$ change = 0.05565). (3) age at first

FIGURE 5.7

ANALYSIS 4 - FINAL STEP

DISTRIBUTION OF BETA COEFFICIENTS AMONG SETS OF DUMMY VARIABLES

Dependent Variable :
Employment Status at Life Cycle Stage 3



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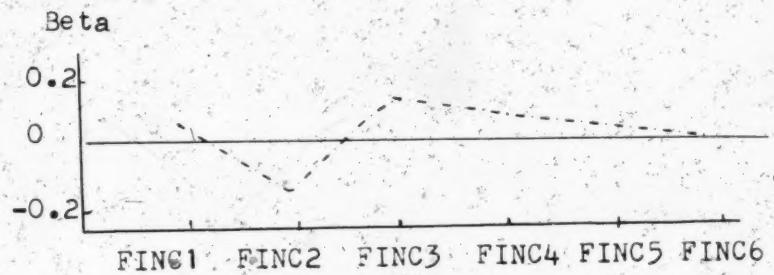
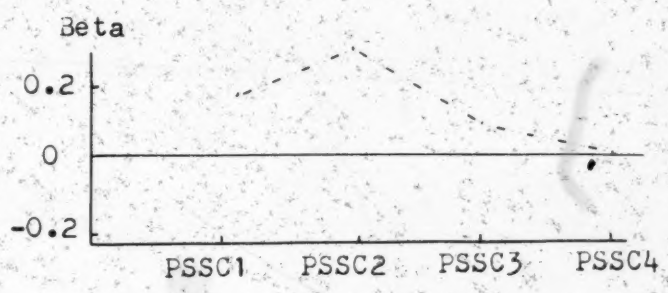


FAMILY INCOME



POST- SECONDARY SUPPORT

TABLE 5.8

ANALYSIS 4 - STEP 10

SUMMARY STATISTICS

DEPENDENT VARIABLE : EMPLOYMENT STATUS AT LIFE CYCLE STAGE 3

Independent Variable	Multiple R^2	Change in R^2	Zero Order r	B (t values)	Beta
YRSW	0.07923	0.07923	0.28147	0.01634 (1.89132)*	0.22786
PSSC2	0.13487	0.05565	0.25714	0.46222 (2.37423)*	0.27428
AFM	0.16217	0.02730	0.23817	0.46130 (2.81625)*	0.57105
EDR2	0.20097	0.03880	0.15385	0.09762 (1.56116)	0.18022
MSTAT	0.22411	0.02314	0.03335	0.69564 (1.84139)*	0.29382
AFB	0.25415	0.03004	0.13910	-0.02465 (-1.71643)*	-0.30241
FINC2	0.27621	0.02206	-0.05853	-0.26396 (-1.67136)*	-0.19055
AIB	0.28674	0.01053	0.08038	0.03142 (1.38051)	0.15447

TABLE 5.8 (CONT'D)

ANALYSIS 4 - STEP 10

SUMMARY STATISTICS

DEPENDENT VARIABLE : EMPLOYMENT STATUS AT LIFE CYCLE STAGE 3

Independent Variable	Multiple R^2	Change in R^2	Zero Order r	B (t values)	Beta
PSSC1	0.30180	0.01506	0.09624	0.17642 (1.52641)	0.17642
EDR1	0.31569	0.01389	-0.06805	-0.15986 (-1.15740)	-0.13235
Constant				-1.26483	

Degree of Freedom for F Ratio : 10, 66

F-value : 3.04472 significant at 0.01 level

Note: * = t values significant at 0.05 level

marriage (R^2 change = 0.02730). (4) marital status (R^2 change = 0.02314), (5) age at first birth (R^2 change = 0.03004) and (6) family income category 2 - $3.000 to 4,999 ($R^2$ change = 0.02206). The other variables in the equation are education category 2, viz 9 to 13 years, average interval between births and post-secondary support category 1 - < $1,000. Total variance explained is 31.6 per cent (R^2 = 0.31569). The F statistic is 3.04472 and is significant at the 0.01 level. The regression equation is :

$$Y = @ + B_1X_1 + B_2X_2 + B_3X_3 + B_4X_4 + B_5X_5 + B_6X_6 + B_7X_7 + B_8X_8 + B_9X_9 + B_{10}X_{10}$$

$$= -1.26483 + 0.01634\ X_1 + 0.46222\ X_2 + 0.46130\ X_3 + 0.09762\ X_4 + 0.69564\ X_5 - 0.02465\ X_6 - 0.26396X_7 + 0.03142\ X_8 + 0.17642\ X_9 - 0.15986\ X_{10}$$

where @ = constant
Y = employment status at life cycle stage 3
X_1= number of years worked
X_2= post-secondary support category 2 - $1,000-3,999
X_3= age at first marriage
X_4= education category 2 - 9 to 13 years
X_5= marital status
X_6= age at first birth
X_7= family income category 2 - $3,000 to 4,999
X_8= average interval between births
X_9= post-secondary support category 1 - $1.000
X_{10}= education category 1 - 0 to 8 years

5.7 Conclusion on Analysis 4

It has been shown that the effects of five variables on the dependent variable employment status at life cycle

stage 3 are as hypothesized : number of years worked - positive, age at first marriage - positive, actual family size - negative, average interval between births - positive and respondent's age - positive. Age at first birth - negative and marital status - positive are not as hypothesized. Education, family income and post-secondary support do not reveal ascending relationships as expected but the magnitude of the associations are consistent with sample characteristics.

The best prediction equation is the regression equation for step 10 which includes six significant variables. The six variables, according to their order of importance, are : (1) number of years worked, (2) post-secondary support category 2 - $1,000 to 3,999, (3) age at first marriage, (4) marital status, (5) age at first birth and, (6) family income.

5.8 Results of Analysis 5

This analysis uses the variable employment status of respondents at life cycle 4 (L4) - when all children are over the age of 6. There are 153 cases in the analysis. The mean observation for the dependent variable is 0.0588 which is close to the mean observed in the analysis of life cycle stage 2 - when children are under 6 years of age (0.0571). The mean age of respondents is higher than the means observed for earlier life cycles at 40.9 years. The

mean number of years worked is 4.5 years which is slightly lower than observed for life cycle stage 3 (4.7 years). The mean age at first marriage is 21.1 years, same as for life cycle stage 1, and the mean age at first birth is 23.3 years, not too different from the other life cycle stages. The mean actual family size is 3.5 children, highest when compared with earlier cycle stages. The mean average interval between births is 3.0 years which is slightly lower than observed for life cycle stage 3 at 3.1 years.

Table 5.9 shows the distributions of employment status among life cycle 4 respondents by education, family income and post-secondary support.

Figure 5.8 presents the beta coefficients from the final step of the regression analysis. There are fourteen variables included in the equation. Total variance explained is 8.9 per cent (R^2 = 0.08890). The variables number of years worked (YRSW) and respondent's age (RAGE) are of statistical significance. Number of years worked explains 3.0 per cent of variance (R^2 = 0.03037). Respondent's age explains an additional 0.6 per cent of variance (R^2 change = 0.00869). The beta coefficients reveal that the directions of relationships of two variables on employment status at life cycle stage 4 are as hypothesized, namely, number of years worked - positive, and average interval between births - positive. The following variables yield relationships which

TABLE 5.9

ANALYSIS 5 - SAMPLE CHARACTERISTICS

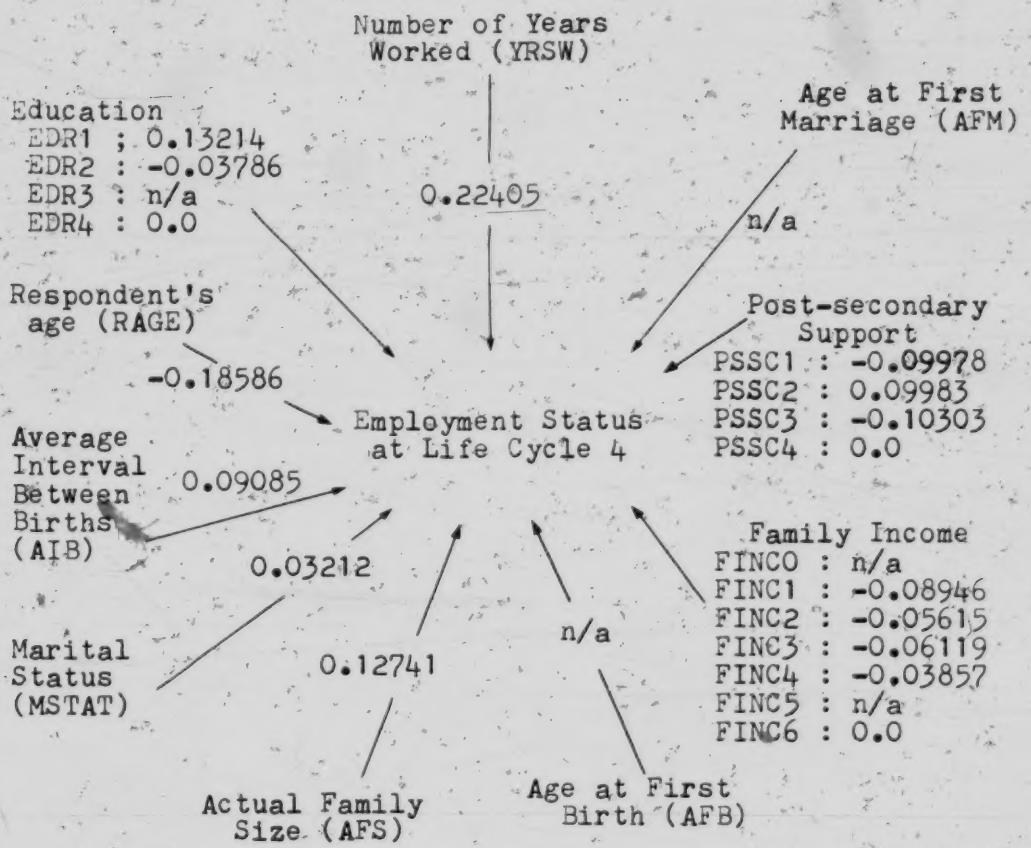
	Employment Status at Life Cycle Stage 4		
Education	Not Employed	Employed	Total
1. 0-8 years (EDR1)	36	3	39
2. 9-13 years (EDR2)	110	4	114
3. Post-secondary (EDR3)	51	5	56
4. Some secondary (EDR4)	18	1	19
Missing data	0	0	0
Total	215	13	228
Family Income			
1. Nil (FINC0)	0	0	0
2. < $3,000 (FINC1)	3	0	3
3. $3,000-4,999 (FINC2)	5	0	5
4. $5,000-6,999 (FINC3)	11	0	11
5. $7,000-9,999 (FINC4)	32	1	33
6. $10,000-14,999 (FINC5)	58	5	63
7. > $15,000 (FINC6)	55	4	59
Missing data	51	3	54
Total	215	13	228
Post-secondary Support			
1. < $1,000(PSSC1)	19	0	19
2. $1,000-3,999 (PSSC2)	21	3	24
3. $4,000-7,999 (PSSC3)	24	0	24
4. > $8,000 (PSSC4)	135	8	143
Missing data	16	2	18
Total	215	13	228

FIGURE 5.8

ANALYSIS 5 - FINAL STEP

BETA COEFFICIENTS

DEPENDENT VARIABLE: EMPLOYMENT STATUS AT LIFE CYCLE STAGE 4



are not as hypothesized : actual family size - positive, marital status - positive and respondent's age - negative. Coefficients for age at first marriage and age at first birth are not available due to insufficient cases for computation.

Figure 5.9 presents the beta coefficients for the sets of dummy variables for education, family income and post-secondary support. Family income is the only variable that reports an approximately linear and ascending relationship as hypothesized. Among the educational categories, higher employment incidences seem to occur in the lowest education group (EDR1) - 8 years or less. Among post-secondary support groups, respondents in the second group - $1,000 to 3,999 (PSSC2) are more likely to be employed than the highest support group (PSSC4) - > $8,000. The first group (PSSC1) - < $1,000 and third group (PSSC3) - $4,000 - 7,999 are the least likely to be employed. The beta coefficients for education and post-secondary support are not linear and ascending as hypothesized but their magnitudes are consistent with the observations for the sample (Table 5.9).

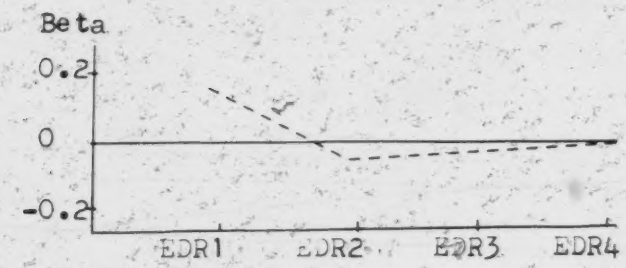
The best prediction equation is the regression equation reported for step 2 where two variables : number of years worked and post-secondary support group 2 - $1,000 to 3,999 are included in the equation (Table 5.10). Total variance explained is 3.9 per cent and number of

FIGURE 5.9

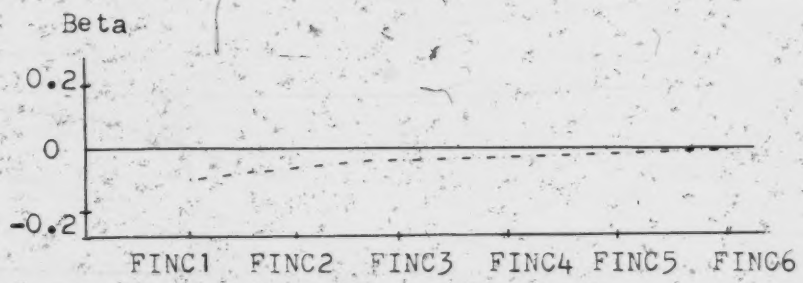
ANALYSIS 5 - FINAL STEP

DISTRIBUTION OF BETA COEFFICIENTS AMONG SETS OF DUMMY VARIABLES

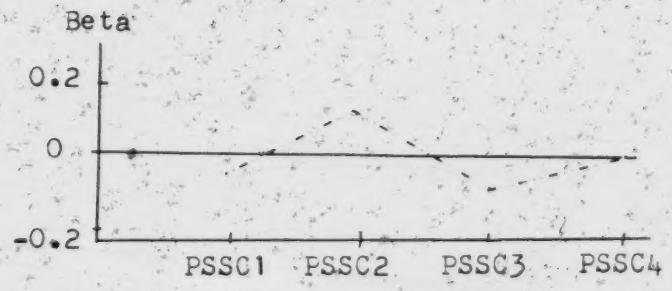
Dependent Variable :
Employment Status at Life Cycle Stage 4



EDUCATION



FAMILY INCOME



POST-SECONDARY SUPPORT

TABLE 5.10

ANALYSIS 5 - STEP 2

SUMMARY STATISTICS

DEPENDENT VARIABLE : EMPLOYMENT STATUS AT LIFE CYCLE STAGE 4

Independent Variable	Multiple R^2	Change in R^2	Zero Order r	B (t values)	Beta
YRSW	0.03037	0.03037	0.17428	0.00989 (2.25883)*	0.18135
PSSC2	0.03927	0.00892	0.08114	0.06915 (1.17987)	0.09469
Constant				0.56799	

Degree of Freedom for F Ratio : 2, 150

F-value : 3.06722 significant at 0.05 level

Note: * = t values significant at 0.05 level

years worked is significant at the 0.05 level (t values = 2.25883). Overall F statistic equals 3.06722 and is significant at the 0.05 level as well. The regression equation is as follows:

$$Y = @ + B_1X_1 + B_1X_1$$

$$= 0.56799 + 0.00989\ X_1 + 0.06915\ X_2$$

where @ = constant
Y = employment status at life cycle stage 4
X_1 = number of years worked
X_2 = post-secondary support category 2 - $1,000 to 3,999

5.9 Conclusion on Analysis 5

In this analysis, the effects of three variables are as hypothesized. These are : number of years worked - positive, interval between births - positive and family income - linear and ascending. The effects of several variables are not as hypothesized. These are actual family size - positive, marital status - positive, and respondent's age - negative. Effects of the dummy variables education and post-secondary support are not as hypothesized but consistent with sample observations. Age at first marriage and age at first birth are not included in the regression equation and their effects are negligible.

The best prediction equation includes two independent variables, namely, number of years worked and post-secondary support category 2 - $ 1,000 to 3,999. While number of years

worked is the only significant variable, the overall regression equation is statistically significant.

5.10 Results of Analysis 6

This analysis examines the effects of the independent variables on the dependent variable employment status of respondents at life cycle stage 5 (D5) - when children are over the age of 18. A total of 17 cases are examined. The mean for the dependent variable is 0.0588, which is the same as the mean observed in life cycle stage 4. The mean age of respondents is the highest among all life cycle groups at 49.8 years. The mean number of years worked is also highest among all life cycle groups at 6.1 years. The mean age at first marriage is 20.8 years and the mean age at first birth is 23.1 years. The mean actual family size is 2.9 children, considerably lower than the means of 3.5 children for life cycle stage 4 and 3.3 children for life cycle stage 3. The mean average interval between births is 3.3 years which is highest among all life cycle groups. Table 5.11 shows the sample characteristics of three variables: education, family income and post-secondary support by employment status at life cycle stage 5.

Figure 5.10 presents the directions of relationships of the different independent variables with the dependent variable in the final step of the regression analysis. The regression equation includes thirteen variables. The

TABLE 5.11

ANALYSIS 6 - SAMPLE CHARACTERISTICS

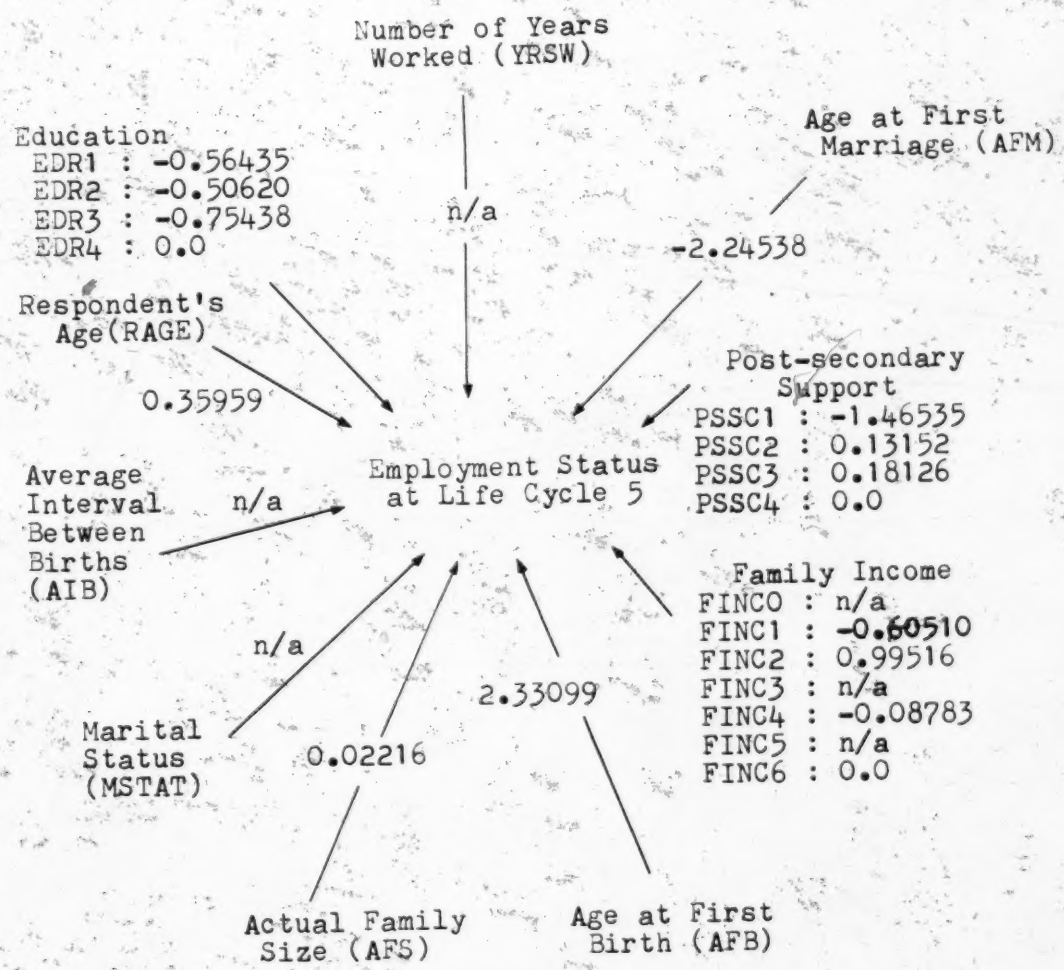
	Employment Status at Life Cycle Stage 5		
Education	Not Employed	Employed	Total
1. 0-8 years (EDR1)	8	0	8
2. 9-13 years (EDR2)	13	0	13
3. Post-secondary (EDR3)	4	0	4
4. Some university (EDR4)	2	1	3
Missing data	0	0	0
Total	27	1	28
Family Income			
1. Nil (FINC0)	0	0	0
2. < $3,000 (FINC1)	2	0	2
3. $3,000-4,999 (FINC2)	0	0	0
4. $5,000-6,999 (FINC3)	3	0	3
5. $7,000-9,999 (FINC4)	8	0	8
6. $10,000-14,999 (FINC5)	5	0	5
7. > $15,000 (FINC6)	6	1	7
Missing data	3	0	3
Total	27	1	28
Post-secondary Support			
1. < $1,000 (PSSC1)	3	0	3
2. $1,000-3,999 (PSSC2)	5	0	5
3. $4,000-7,999 (PSSC3)	2	0	2
4. > $8,000 (PSSC4)	12	1	13
Missing data	5	0	5
Total	27	1	28

FIGURE 5.10

ANALYSIS 6 - FINAL STEP

BETA COEFFICIENTS

DEPENDENT VARIABLE: EMPLOYMENT STATUS AT LIFE CYCLE STAGE 5



effects of the variables age at first birth - positive, and respondent's age - positive are as hypothesized. The effects of age at first marriage - negative, and actual family size - positive are not as hypothesized. Beta coefficients for number of years worked, marital status and average interval between births are not available.

Beta coefficients for the dummy variables created for education, family income and post-secondary support are presented graphically in Figure 5.11. Effects are found to be mixed and are not linear and ascending as expected. Among the education groups, the lowest participation in the labour force seems to be education group 3 - some post-secondary (EDR3). The highest participation is the control group 4 (EDR4) - some university, as expected. Among family income groups, the highest participation group is group 2 (FINC2) - $3,000 to 4,999. Among post-secondary support groups the lowest psrticipation group is group 1 (PSSC1) - < $1,000, as hypothesized. Participation is highest for group 3 - $4,000 to 7,999 (PSSC3) and declines somewhat for groups 2 (PSSC2) and 4 (PSSC4).

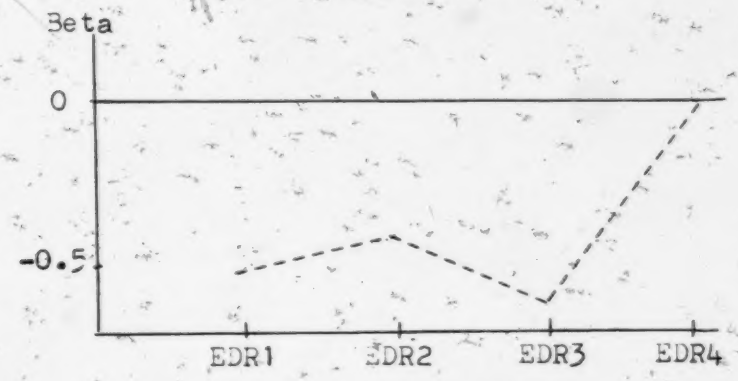
In the final step, a high correlation between age at marriage and age at first birth is found (r = 0.82907). This high correlation may contribute to a risk of multicollinearity and biased estimates. However, the best prediction equation is the equation resulted from step 1

FIGURE 5.11

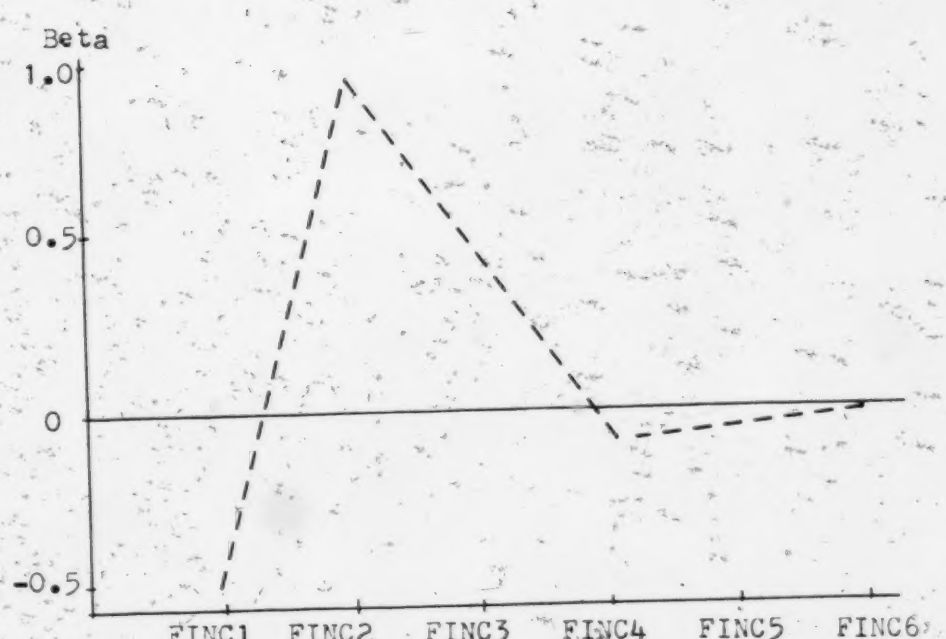
ANALYSIS 6 - FINAL STEP

DISTRIBUTION OF BETA COEFFICIENTS AMONG SETS OF DUMMY VARIABLES

Dependent Variable :
Employment Status at Life Cycle Stage 5

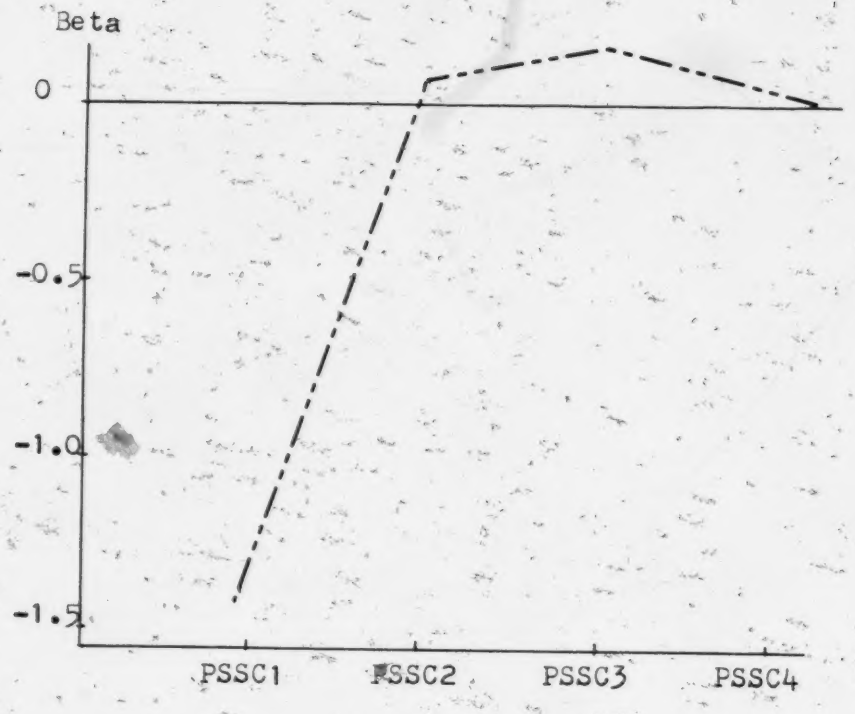


EDUCATION



FAMILY INCOME

FIGURE 5.11 (CON'D)



POST- SECONDARY SUPPORT

when age at first marriage is the significant independent variable (t values = 2.14991). The proportion of variance explained is 23.5 per cent (R^2 = 0.23501). Overall F statistic equals to 4.60821 and is significant at the 0.5 level (Table 5.12). One must note that in this step age at first marriage is found to be positively related to employment status which is not as found in the final step and is as hypothesized. This suggests that the introduction of other variables in the regression equation reverses the effect of age at first marriage on employment status at life cycle stage 5.

The regression equation is as follows:

$$Y = @ + B_1X_1$$

$$= - 0.6869031 + 0.03581\ X_1$$

where @ = constant

Y = employment status at life cycle stage 5

X_1 = age at first marriage

5.11 Conclusion on Analysis 6

In this analysis, it is found that in the final step the effects of the variables age at first birth - positive, and respondent's age - positive are as hypothesized. Age at first marriage - negative and actual family size - positive are not as hypothesized. The effects of education, family income and post-secondary support are mixed and not as linear and ascending as expected.

TABLE 5.12

ANALYSIS 6 - STEP 1

SUMMARY STATISTICS

DEPENDENT VARIABLE : EMPLOYMENT STATUS AT LIFE CYCLE STAGE 5

Independent Variable	Multiple R^2	Change in R^2	Zero Order r	B (t values)	Beta
AFM	0.23501	0.23501	0.48478	0.03581 (2.14991)*	0.48478
Constant				-0.6869031	

Degree of Freedom for F Ratio : 1, 15

F-value : 4.60821 significant at 0.05 level

Note: * = t value significant at 0.05 level

The best prediction equation is found in Step 1 where age at marriage is the significant independent variable. The direction of relationship is positive and is as hypothesized.

CHAPTER 6

TESTING OF HYPOTHESES

This chapter examines the results of the regression analyses in an attempt to test the hypotheses formulated for this thesis, and to discuss the implications of the results of the analyses.

Three hypotheses related to the interactions of female force participation, life cycle stages and fertility have been presented in Chapter 2. Each hypothesis will be tested separately.

6.1 Hypothesis 1

Hypothesis 1 states that:

> "Women with relatively inexpensive job skills or low educational attainment are expected to have larger families than women with better job skills or higher educational attainment. It is expected that the former participate in the labour force even at inconvenient stages of the life cycle because of financial reasons."

To test the validity of the first statement in Hypothesis 1 that women with low job skills or low educational attainment are expected to have large families, a regression analysis using actual family size as the dependent variable is conducted. The dependent variables

used are indicators of job skills and educational attainment. These variables are number of years worked and education categories 1 to 4. Education category 4 is the control variable and is not included in the equation.

Education is expected to be negatively related to fertility. The relationship between fertility and the dummy variables for the education categories are to follow a descending order. The families of women in education category 4 are expected to be the smallest among all four educational groups. Since education category 4 is used as a control variable and its effect on fertility is assumed to be zero, the beta coefficients of the dummy variables education categories 1 to 3 (EDR1 to EDR3) are expected to be greater than zero and are in descending order.

The variable number of years worked is assumed to be negatively related to family size. Women who have little or no work experience are expected to value home life and the role of the mother and homemaker more than the role of the working women. They are expected to have larger families than women with a proven record of working experience.

Results of the regression are presented in Table 6.1. It shows that education is significant in determining and predicting actual family size. The relationship between education and actual family size conforms to the expected pattern of negative association. The effect of education

TABLE 6.1

MULTIPLE REGRESSION ON ACTUAL FAMILY SIZE

SUMMARY STATISTICS

Independent Variable	Multiple R^2	Change in R^2	Zero Order r	B (t values)	Beta
EDR1	0.05069	0.05069	0.22429	2.14451 (9.840394)*	0.34062
EDR2	0.08827	0.03758	0.05636	0.95597 (6.54553)*	0.27167
EDR3	0.08854	0.00027	-0.01633	0.79442 (4.91686)*	0.19833
YRSW	0.08862	0.00008	0.00720	0.00679 (0.68935)	0.02057
Constant				0.92516	

Degrees of Freedom for F Ratio : 4, 1039

F-value : 25.25754 significant at 0.01 level

Note: * = t values significant at 0.05 level

on fertility is linear and descending as hypothesized (Figure 6.1). Education categories 1 to 3 accounts for 8.85 per cent of the variance (R^2 = 0.08854). Education group 1, the first in the regression step, is the most important category, followed by education groups 2 and 3 respectively. The beta coefficients decrease in magnitude as education levels increase. The other independent variable employed in the regression, number of years worked, however, shows no significant relationship with actual family size.

The second part of Hypothesis 1 states that women with low job skills participate in the labour force even at 'inconvenient' stages of the life cycle because of financial reasons. In other words, it is assumed that women at 'inconvenient' stage of the life cycle, that is, when children are very young, and regardless of their education, work experience and other characteristics, would prefer not to participate in the labour force. However, we must note that this point has already been disproved with our empirical findings in Chapter 5, when we discuss female employment at life cycle stages 2 and 3.

Here it is inferred from Analysis 3 (life cycle stage 2) that education and work experience are not significant in determining labour force participation. Family size and average interval between births are positively related to employment. In Analysis 4 (life cycle stage 3 - with children

under and above 6 years of age), we found that work experience is positively related to employment, and income is negatively related to employment. This disproves our conjecture that women will participate at inconvenient times when their education or job skills are low because of financial reasons. On the other hand, data suggest that women will more likely participate in the labour force if their job skills are high - as indicated by more work experience. However, education has no effect. These women are likely to participate in the labour force in spite of large families provided the average interval between births is long - enabling them to build up work experience through working during the lengthy time periods between births. Family income has shown no significance in predicting employment among women in these life cycle stages.

Our findings suggest that women with low educational attainment tend to have larger families and women with larger families do tend to participate in the labour force at 'inconvenient' life cycle stages, as indicated by life cycle stage 2 - when children are under 6 years of age, and life stage 3 - when children are under and above 6 years of age. Income as indicated by family income does not have significant effect on labour force participation among women in these two life cycle stages, nor does it have significant effect on labour force participation among women

in general. Thus our data confirm the first part of Hypothesis 1 where it states that women with low educational attainment are expected to have larger families than women with better job skills or higher educational attainment. The qualification 'inexpensive job skills' as indicated by little work experience is found to have no effect on family size. The latter part of the hypothesis which states that women with inexpensive job skills or low educational attainment participate in the labour force at 'inconvenient stages' of the life cycle because of financial reasons' is only partially supported. Our findings show that women in lower income groups work for financial reasons when their children are young. Family income category 2 (FINC2) - between $3,000 and $4,999, is found in Analysis 4 to be significant in predicting female employment when women are in life cycle stage 3 - with children both under and over 6 years of age.

It may seem only logical that women with only very young children (under 6 years) would be inclined to stay home even though family income is low. For these women, mothering and childcare are the most important duties at this life cycle stage. When some of the children grow older, the number of children under six years of age is probably small (given today's norm of small family size). Older children can also share some light household chores and assist the mother in sibling care. It thus becomes

feasible at this stage for the mother to seek employment and improve family finances with the earned income. This is particularly important when family income is low.

One may argue that family income, the variable used in the analysis, is not the most appropriate indicator in explaining financial need. Family income is total income acquired by all the members in the family. It may refer to the total income of both husband and wife when both of them work, or it may refer to the income of the family member who works, be it the husband or the wife. It may also include the earnings of the children. The relationship between family income and female labour force participation can be used to describe the contribution of the women to the support of the family, to maintain or further a certain style of living, or the desire for upward mobility. Many studies have used husband's income. Its causal effects on fertility are clear. In this study, husband's income is therefore not tested again. Family income is chosen because it has not been studied. In light of the small sample, the use of husband's income would further restrict the size of the data in the analysis.

Reasons for participating in the labour force may vary among women from different groups. Among the higher income groups (FINC4 and up), or from $7,000 and up, one can reasonably postulate that women participate in the labour

force because of a variety of reasons. Among single, separated, divorced or widowed women, the reason would be mostly financial. Among married women, other reasons may be more important. These may reflect individual aspirations. Some financially related reasons may be to pay the mortgage, to support children to college, and to save for retirement. Other reasons may be social and psychological, such as to obtain satisfaction through career achievements; to escape from the day to day drudgery of housework, to improve one's status, as the term 'housewife' has often been treated as a low status occupation; to obtain self fulfillment through useful and paid work; to establish economic independence and thus personality independency; to participate in a more decisive role in family finances; and to improve self confidence. There is also social pressure from peers and othere, on today's women to work. To establish the importance of these differentials in explaining female labour force participation would require detailed studies on the individual circumstances and motives and are beyond the scope of this thesis.

6.2 Hypothesis 2

Hypothesis 2 states that:

> "During childbearing and childrearing years labour force participation rates will be low among women with close child spacing intervals. These women will more likely participate in the labour force after the youngest child reaches school age."

The first statement in the hypothesis can be tested by examining the labour force participation pattern of women during specific life cycles of childbearing and childrearing. These can be defined as those years when children are young and require a lot of time and attention from mothers. The regression analyses on life cycle stage 2 - when children are under 6 years of age (Analysis 3) and on life cycle stage 3 - when children are under 6 and over 6 years of age (Analysis 4) offer useful observations.

In Analysis 3 (life cycle stage 2 - with children under 6 years of age) average interval between births (AIB) is found to be positively and significantly related to female employment (Table 5.7). This means that for women with children under age six at home, the longer the average birth interval, the more likely the participation in the labour force, and, conversely, the shorter the average birth interval, the less likely the participation. This finding confirms the first part of the hypothesis which states that labour force participation will be low among women with close child spacing intervals during childbearing and childrearing years at least for those women with pre-school age children.

In Analysis 4 (life cycle stage 3 - when children are under 6 and over 6 years of age), average interval between births (AIB) is found to be positively but not significantly related to female labour force participation (Table 5.10).

As a result, the first statement in Hypothesis 2 should be accepted. It has been found that women with close birth intervals and very young children at home (all under 6 years of age), are less likely to be participating in the labour force.

The second part of the hypothesis is tested by using the findings in Analysis 5 and Analysis 6 when employment patterns of women in life cycle stage 4 - when children are over 6 years of age and in life cycle stage 5 - when children are over 18 years of age, are examined. In both of these analyses, average interval between births (AIB) is not found to be significant in explaining female employment. The second statement in Hypothesis 2 which states women with close intervals will more likely participate in the labour force after the youngest child reaches school age is thus rejected.

The reasons for the observations for the first part of the hypothesis are similar to the reasons presented for Hypothesis 1. Very young children aged close together require a lot of time and effort from the mother in providing proper care and attention. Very often the mother devotes all her energy to care for her closely spaced children and has no desire to seek work outside the home. In life cycle stage 3 (Analysis 4), as some of her children grow older, say, more than 6 years of age and attending school,

they require less day to day care from the mother. The hectic duties of the mother can be relieved a little at this stage, rendering some time and energy for the mother to prepare for and consider employment outside the home. It is found that at this life cycle stage, the mother may have the opportunity to accumulate work experience which in turn becomes the sole significant factor affecting labour force participation.

In examining the second part of the hypothesis, it is found that women with close birth intervals do not tend to participate in the labour force when their children are young. For women who do not have young children at home, the effect of close birth interval is of no impact on labour force participation. At this stage when children go to school and when childcare requirements are minimal, birth interval is no longer a crucial factor affecting labour force participation. Other factors, such as work experience, desire for post-secondary support for children are more important determinants in predicting female labour force participation.

6.3 Hypothesis 3 - the Becker Hypothesis

Hypothesis 3 states that:

> "Women with high educational attainments or employable skills are more likely to prefer 'high quality' children in the indirect economic sense. They are more likely to stay in the labour force longer in order to be financially secure.

Consequently the families can assist their children in the acquisition of post-secondary education. Such women are also more likely to have a small family size."

A series of multiple regression analyses have been conducted to test the validity of the statements presented in Hypothesis 3. The first statement derives from Becker's theory on the economic analysis of fertility. 'High quality' children are defined in this study as children whose parents are willing to give full financial support in attaining post-secondary education. It is inferred that the more the intended post-secondary support, the higher the 'quality' of the children. In the regression analyses, the dummy variables on post-secondary support are used as the dependent variables. The post-secondary support categories are:

(1) post-secondary support group 1 (PSSC1) - less than $1,000 support, including no support, or room only, or room and board for one or two years, or $500 to $999 for one year only;

(2) post-secondary support group 2 (PSSC2) - $1,000 to $3,999 support, including room and board for two or more years, or full support for one year of post-secondary school attendance;

(3) post-secondary support group 3 (PSSC3) - $4,000 to $7,999 support, including those willing to contribute $1,000 to $1,999 for three years or more, or full support for two to three years;

(4) post-secondary support group 4 (PSSC4) - $8,000 or more of support including those willing to support for four or more years of post-secondary education.

The independent variables used for the regression are number of years worked (YRSW) and the dummy variables education categories 1 to 4 (EDR1 to (EDR4). They are defined as:

(1) education category 1 (EDR1) - 0 to 8 years of education;

(2) education category 2 (EDR2) - 9 to 13 years;

(3) education category 3 (EDR3) - post-secondary but no university; and,

(4) education category 4 (EDR4) - university.

Four separate regressions are prepared using the independent variables number of years worked and education categories on each of the post-secondary support categories as dependent variables. The purpose is to establish the significance and the relationship between work experience and education on the 'quality' of children preferred by respondents as indicated by the declared or intended extent of support for the children's post-secondary education. Regression results are presented in Tables 6.2 to 6.5.

As in previous analyses, the variable education is restructured to form four dummy variables according to the education categories. Education category 4 (EDR4) - university, is used as control and its effect on the quality of children is assumed to be zero. The association between education and post-secondary support is expected to be positive. In other words, the higher the education of the respondent,

the higher the preferred 'quality' of children, or post-secondary support. Since the effect of the highest education category (EDR4) on post-secondary education is assumed to be zero, the signs of the regression coefficients will vary. The magnitude of the standardized regression coefficients (beta) will be descending from the lower education group to the higher education groups among the lower post-secondary support groups, and will be ascending for the higher post-secondary groups. A rough postulation of the expected relationship is presented in Figure 6.1.

Number of years worked is also expected to be positively related to the 'quality' of children (post-secondary support).

The regression results of Table 6.2 to 6.4 show that number of years worked and education are not significantly related to post-secondary support groups 1 to 3 (PSSC1 to PSSC3). The F value for these three regression analyses are not significant at the 0.05 level. Examination of individual variables shows that the lowest education category (EDR1) is significant and positively related to the lowest post-secondary support group (PSSC1) (Table 6.2 - t values = 1.79626). The same variable, education category 1 (EDR1) is also found to be significantly related to post-secondary support group 2 (PSSC2) (Table 6.3 - t values = 1.696103). For the higher post-secondary support group (PSSC3), the

FIGURE 6.1

HYPOTHESIS 3

EXPECTED MAGNITUDE AND DIRECTION OF BETA COEFFICIENTS

Dependent Variables :
Post-secondary Support Groups
1 to 4 (PSSC1 to PSSC4)

Independent Variables :
Education Categories 1 to 4
(EDR1 to EDR4)

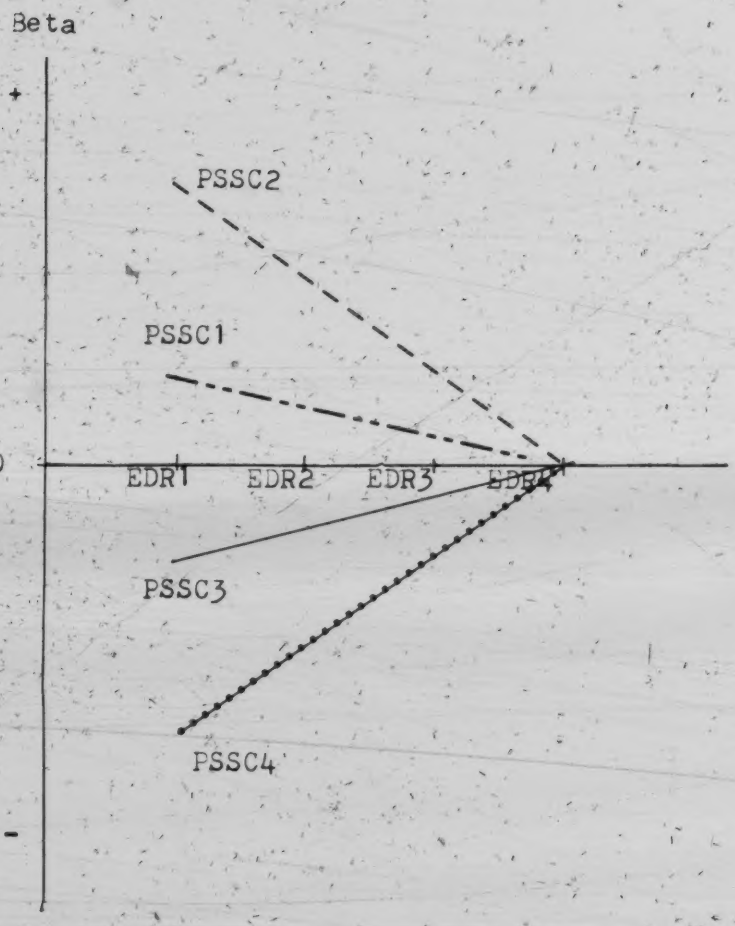


TABLE 6.2

MULTIPLE REGRESSION ON POST-SECONDARY SUPPORT GROUP 1

SUMMARY STATISTICS

Independent Variable	Multiple R^2	Change in R^2	Zero Order r	B (t values)	Beta
EDR1	0.00373	0.00373	0.06286	0.06723 (1.79626) *	0.06765
YRSW	0.00487	0.00114	-0.03380	-0.00145 (-0.88393)	-0.02898
EDR2	0.00509	0.00022	-0.00052	0.01040 (0.42847)	0.01941
EDR3	0.00511	0.00002	-0.02019	0.00341 (0.12718)	0.00561
Constant				0.07392	

Degrees of Freedom for F Ratio : 4, 936

F-value : 1.20165 not significant at 0.05 level

Note: * = t values significant at 0.05 level

TABLE 6.3

MULTIPLE REGRESSION ON POST-SECONDARY SUPPORT GROUP 2

SUMMARY STATISTICS

Independent Variable	Multiple R^2	Change in R^2	Zero Order r	B (t values)	Beta
EDR1	0.00265	0.00265	0.05265	0.06978 (1.69610)*	0.06586
EDR2	0.00513	0.00248	0.03449	0.02776 (0.67475)	0.04716
YRSW	0.00559	0.00046	-0.02138	-0.00073 (-0.40450)	-0.01331
EDR3	0.00562	0.00003	-0.04691	-0.00490 (-0.166264)	-0.00733
Constant				0.08191	

Degree of Freedom for F Ratio : 4, 936

F-value : 1.32205 not significant at 0.05 level

Note: * = t values significant at 0.05 level

second education category (EDR2) is significant (Table 6.4 - t values = 1.986765).

The regression analysis on the post-secondary support group (PSSC4) reports a F value of 4.13848 and is significant at the 0.025 level (Table 6.5). Education categories 1 and 2 (EDR1 and EDR2) are both significant and negatively related to post-secondary support group 4. These findings conform to the expected ascending relationship. Figure 6.2 presents the magnitude and directions of the beta coefficients reported in the analyses. The amount of variance explained by both of these variables (EDR1 and EDR2) amounts to 1.6 per cent (R^2 = 0.01603). Total variance explained by all the variables in the equation is 1.7 per cent (R^2 = 0.01738). The regression equation is as follows:

$$PSSC4 = @ + B_1EDR2 + B_2EDR1 + B_3YRSW + B_4EDR3$$
$$= 0.75028 - 0.09970\ EDR2 - 0.20385\ EDR1$$
$$+ 0.00184\ YRSW - 0.01543\ EDR3$$

where @ = constant
PSSC4 = post-secondary support group 4
EDR2 = education category 2
EDR1 = education category 1
YRSW = number of years worked
EDR3 = education category 3
B_i = regression coefficient

Based on the results of the regression analyses, the first statements in Hypothesis 3: "Women with high educational attainments or employable skills are more likely to prefer 'high quality' children" has been rejected. Instead of

TABLE 6.4

MULTIPLE REGRESSION ON POST-SECONDARY SUPPORT GROUP 3

SUMMARY STATISTICS

Independent Variable	Multiple R^2	Change in R^2	Zero Order r	B (t values)	Beta
EDR2	0.00517	0.00517	0.06223	0.06155 (1.98677)*	0.09000
EDR1	0.00571	0.00054	0.02326	0.06684 (1.39857)	0.05265
EDR3	0.00080	0.00026	-0.03862	0.01692 (0.49464)	0.02182
YRSW	0.00081	0.00001	-0.00261	0.00035 (0.164345)	0.00540
Constant				0.093893	

Degree of Freedom for F Ratio : 4, 936

F-value : 1.40504 not significant at 0.05 level

Note: * = t values significsnt at 0.05 level

TABLE 6.5

MULTIPLE REGRESSION ON POST-SECONDARY SUPPORT GROUP 4

SUMMARY STATISTICS

Independent Variable	Multiple R^2	Change in R^2	Zero Order r	B (t values)	Beta
EDR2	0.00875	0.00875	-0.06772	-0.09970 (-2.39557)*	-0.10788
EDR1	0.01603	0.00728	-0.08716	-0.20385 (-3.17473)*	-0.11884
YRSW	0.01726	0.00123	0.03513	0.00184 (0.65130)	0.02127
EDR3	0.01738	0.00012	0.07016	-0.01543 (-0.33578)	-0.01472
Constant				0.75028	

Degree of Freedom for F Ratio : 4, 930

F-value : 4.13848 significant at 0.025 level

Note: * = t values significant at 0.05 level

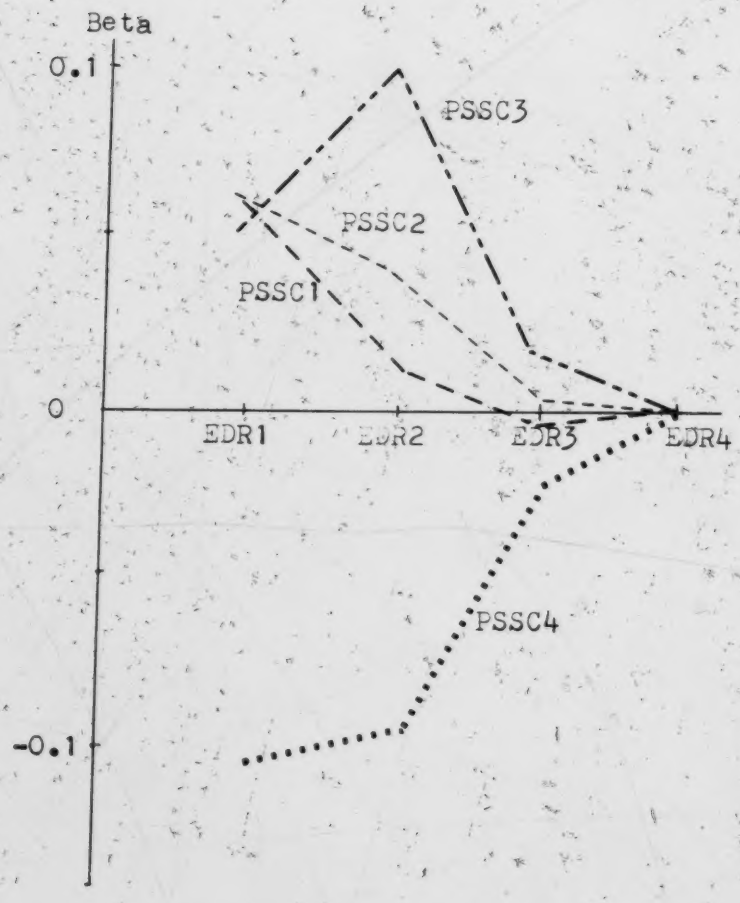
FIGURE 6.2

HYPOTHESIS 3

MAGNITUDE AND DIRECTION OF BETA COEFFICIENTS

Dependent Variables:
Post-secondary Support Groups
1 to 4 (PSSC1 to PSSC4)

Independent Variables :
Education Categories 1 to 4
(EDR1 to EDR4)



finding significant impacts of educational attainment and work experience on post-secondary support, we found that low educational attainment was significantly related to post-secondary support and work experience had no effect on post-secondary support at all. In other words, we found that women with less than or equal to high school education were more likely to give generous support to their children in order to attain post-secondary education than women with higher educational attainment.

This finding also rejects the second and the third statements in Hypothesis 3 which suggest that women with high educational or employable skills participate in the labour force because they want to assist their children to attain post-secondary education.

In Chapter 4 (Analysis 1), intended post-secondary support is found to be insignificantly related to labour force participation of women at all life cycle stages. In Chapter 5, subsequent analyses reveal variable patterns. In Analysis 2 (life cycle stage 1 - women with no children), post-secondary support group 3 (PSSC3) is found to be significantly related to labour force participation. In Analysis 3, post-secondary support is not significant for labour force participation of women who have very young children at home (life cycle stage 2). In Analysis 4, post-secondary support groups 1 and 2 (PSSC1 and PSSC2) are significant for women with children both under 6 and over

6 years of age. In Analysis 5, post-secondary support is not significant for the labour force participation of women whose children are over 6 but under 18 years of age (life cycle stage 4). In Analysis 6, post-secondary support is not significantly related to labour force participation of women in life cycle stage 5 when children are over 18.

One plausible explanation is that women in life cycle 1, before they have children, are more idealistic in their expectations from children. Post-secondary education thus becomes an important factor influencing labour force participation decisions. One can infer that the women may have the intention to establish a career and to be financially secure before they have children, now that they have no childcare responsibilities and are free to work.

At life cycle stage 2, post-secondary support becomes insignificant. At this stage, women are busily occupied with the chores associated with rearing young children. Other factors may override the importance of post-secondary support in securing employment. These factors may include the concern about adequate daycare, the desire to be with the children when they are small, and the feeling of guilt when mothers leave their young children to go to work. Also at this time when children are small it may seem a little too early to worry about post-secondary support which will probably occur in more than fifteen years ahead.

In life cycle stage 3 - with children both under

6 and over 6 years of age, post-secondary support groups 1 and 2 are found to be significant factors in determining labour force participation. At this stage childcare duties vary, and the mother may have established a manageable routine. Older children presumably can assist the mother with some light household or childcare chores and relieve some pressures off the mother. The mother can thus proceed with the planning for the children's education requirements in the future. Post-secondary support becomes an important factor in influencing employment decisions.

In life cycle stage 4, when children are over 6 years of age and are attending school, post-secondary support is no longer a significant factor in determining labour force participation. This observation may appear strange since at this time only a limited number of years is left before the children will be enrolling in post-secondary institutions. It seems to be the perfect period for planning for post-secondary support. One possible explanation for this lack of significance is that after children reach school age, labour force participation is very prevalent among women in this life cycle stage. Labour force participation may vary with individual skills. Number of years worked is found to be the predominant factor determining labour force participation.

The last sentence in Hypothesis 3 states that women with high educational attainment and employable skills are also likely to have a small family size. This section of

the hypothesis can be tested by way of a regression analysis using actual family size as the dependent variable. The independent variables used in the analysis are number of years worked, education (EDR1 to EDR4) and post-secondary support (PSSC1 to PSSC4). The latter two are sets of dummy variables with category 4 (EDR4 and PSSC4) as control.

It is expected that education is negatively related to family size. Since the highest education category is used as the control variable, the beta coefficients will be positive, and the magnitude of the beta coefficients will decrease as educational levels increase.

Number of years worked is expected to be negatively related to actual family size.

Post-secondary support is expected to be negatively related to actual family size. However, due to the set up of the control dummy variable, beta coefficients are to be positive but decreasing in magnitude as the amount of support increases.

Table 6.6 presents the results of the regression analysis. The direction and magnitude of the beta coefficients for education are positive and descending as expected. For post-secondary support, the direction is positive for the support group 1 (PSSC1) and negative for the higher groups 2 and 3 (PSSC2 and PSSC3). This is not as anticipated. One must also note that post-secondary support groups 2 and 3 are not significantly related to

TABLE 6.6

MULTIPLE REGRESSION ON ACTUAL FAMILY SIZE

USING SELECTED VARIABLES

Independent Variable	Multiple R^2	Change in R^2	Zero Order r	B (t values)	Beta
EDR1	0.04753	0.04753	0.21612	2.14887 (9.06735)*	0.32712
EDR3	0.70620	0.02309	-0.00882	0.82215 (4.87284)*	0.20484
EDR2	0.08879	0.01817	0.06261	0.98404 (6.41945)*	0.27804
PSSC1	0.09878	0.00999	0.12051	0.66112 (3.16810)*	0.10002
PSSC3	0.09999	0.00121	-0.03475	-0.21300 (-1.29785)	-0.04116
YRSW	0.10014	0.00015	0.01222	0.01192 (1.15183)	0.03605
PSSC2	0.10019	0.00005	0.00480	-0.04506 (-0.23685)	-0.00749
Constant				0.90222	

Degree of freedom for F ratio : 7, 933
F-value : 14.84056 significant at 0.05 level

actual family size (t values = 1.29785 and 0.23685 respectively). Number of years worked is positively related to actual family size, an unexpected finding, but is not significant (t values = 1.15183).

Education (EDR1 to EDR3) and post-secondary support group 1 (PSSC1) are significantly related to actual family size. Total variance explained by these four variables is 9.9 per cent (R^2 = 0.09878). The overall F statistic for the regression equation is 14.8456 and is significant at the 0.01 level. Total variance explained by the regression equation, when work experience and other post-secondary groups are also considered, is 10.0 per cent (R^2 = 0.10019). The regression equation is as follows:

$$AFS = @ + B_1 EDR1 + B_2 EDR3 + B_3 EDR2 + B_4 PSSC1 + B_5 PSSC3 + B_6 YRSW + B_7 PSSC2$$

$$= 0.90222 + 2.14887\ EDR1 + 0.82215\ EDR3 + 0.98404\ EDR2 + 0.66112\ PSSC1 - 0.21300\ PSSC3 + 0.011921\ YRSW - 0.04506\ PSSC2$$

where @ = constant
AFS = actual family size
EDR1 = education category 1
EDR3 = education category 3
EDR2 = education category 2
PSSC1 = post-secondary support group 1
PSSC3 = post-secondary support group 3
YRSW = number of years worked
PSSC2 = post-secondary support group 2
B_i = regression coefficient

The regression results show that number of years worked and the higher post-secondary support groups are

not significantly associated with actual family size. Education and post secondary support group 1 are significantly related to actual family size. The pattern of association between these two variables and actual family size is as expected.

The findings support the last statement in Hypothesis 3 only partially. It is found that women with high educational attainment tend to have small families, and women who are willing to contribute minimal support to their children's post-secondary education tend to have larger families. Employable skills as indicated by work experience, and high post-secondary support, however, are not found to be significantly related to actual family size.

This chapter has tested the three hypotheses established earlier in Chapter 2. It has established empirically the reasons for accepting or rejecting the hypotheses and has provided necessary qualifications and explanations for reassessing the postulated patterns of associations.

CHAPTER 7

SUMMARY AND CONCLUSIONS

This chapter presents a summary of the analyses undertaken in the thesis, and a discussion on the theoretical and policy implications of the findings concerning associations between fertility, life cycle stage and female labour force participation.

7.1 Summary of Findings

The analysis presented in the thesis follow three steps. The first step involves the examination of the effects of fertility, life cycle stages and a host of socio-economic variables on female labour force participation. The second step involves the examination of the effects of the various independent variables on the female labour force participation patterns of women in different life cycle stages. The third step is the testing of hypotheses formulated for the thesis. The socio-economic variables chosen for examination are marital status, family income, education, intended post-secondary support for children, and number of years worked. Age at first marriage, age of respondent and actual family size are the

demographic variables examined. The purpose is to determine whether fertility, life cycle stages or any of the other independent variables have significant influence on female labour force participation. If these factors do affect female labour force participation, which are the more important ones?

Stepwise regression analysis using dummy variables is used as a tool to examine the patterns of association. Stepwise regression has the advantage of ranking the independent variables according to the amount of variance explained for the dependent variable. It permits the researcher to study the differential strengths and weakness of the independent variables and to select the most appropriate regression equation for prediction purposes. Dummy variables are used to transform nominal variables into suitable use in multiple regression analysis.

Table 7.1 presents the regression results and related statistics for the analyses presented in Chapters 4 to 6 of the study. A brief description of the findings is presented in the following paragraphs.

Analysis 1 examines the effects of fertility, life cycle stages and other socio-economic variables on female labour force participation for women in all life cycle stages. Number of years worked is the most important variable in explaining female labour force participation.

TABLE 7-1 SUMMARY OF FINDINGS

Analysis (Chapter	Dependent Variable	Independent Variables	B (t value)	Change in R^2	Multiple R^2
1 (4)	employment	years worked	0.00935 * (3.50098)	0.03039	0.03039
		age at first marriage	0.01139 * (2.05703)	0.00733	0.03772
		age at first birth	-0.00564 (-1.26085)	0.00432	0.04204
		constant	-0.09461		
		F-value = 5.14884 significant at 0.01 level			
2 (5)	employment at life cycle 1 (no children)	family income group 5 ($10,000-14,999)	0.16676 * (2.25511)	0.19340	0.19340
		education group 2 (9 to 13 years)	0.12311 * (1.84692)	0.03138	0.22477
		post-secondary support group 3 ($4,000-7,999)	-0.17310 * (-1.88094)	0.02962	0.25440
		age at first marriage	-0.01625 (-1.59965)	0.01192	0.26631

TABLE 7-1 SUMMARY OF FINDINGS (Con'd)

Analysis (Chapter)	Dependent Variable	Independent Variables	B (t values)	Change in R^2	Multiple R^2
		years worked	0.01258 (1.55267)	0.03313	0.29944
		constant	0.28394		
		F-value = 4.35977 significant at 0.01 level			
3 (5)	employment at life cycle 2 (children under 6 years)	actual family size	0.29444 * (2.24485)	0.08908	0.08908
		average interval between births	0.06373 * (1.98458)	0.07108	0.16015
		respondent's age	0.01301 (1.36663)	0.05290	0.21305
		education group 1 (less than 9 years)	-0.22642 (-1.33432)	0.04409	0.25714
		constant	-1.01931		
		F-value = 2.59615 not significant at 0.05 level			
4 (5)	employment at life cycle 3 (children under and over 6 years)	years worked	0.01634 * (1.89132)	0.07923	0.07923
		post-secondary support ($1,000-3,999)	0.46222 * (2.37423)	0.05565	0.13487

TABLE 7-1 SUMMARY OF FINDINGS (Cont'd)

Analysis (Chapter)	Dependent Variable	Independent Variables	B (t value)	Change in R^2	Multiple R^2
		age at first marriage	0.46130 * (2.81625)	0.02730	0.16217
		education group 2 (9 to 13 years)	0.09762 (1.56116)	0.03880	0.20097
		marital status	0.69564 * (1.84139)	0.02314	0.22411
		age at first birth	-0.02465 * (-1.71643)	0.03004	0.25415
		family income group 2 ($3,000-4,999)	-0.26396 * (-1.67136)	0.02206	0.27621
		average interval between births	0.03142 (1.38051)	0.01053	0.28674
		post-secondary support group 1 (< $1,000)	0.17642 (1.52641)	0.01506	0.30180
		education group 1 (less than 9 years)	-0.15986 (-1.15740)	0.01389	0.31569
		constant	-1.15740		
		F-value = 3.04472 significant at 0.01 level			

TABLE 7-1 SUMMARY OF FINDINGS (Cont'd)

Analysis (Chapter)	Dependent Variable	Independent Variables	B (t value)	Change in R^2	Multiple R^2
5 (5)	employment at life cycle 4 (children over 6 years)	years worked	0.00989 * (2.25883)	0.03037	0.03037
		post-secondary support group 2 ($1,000-3,999)	0.06915 (1.17987)	0.00892	0.03927
		constant	0.56799		
		F-value = 3.06722 significant at 0.05 level			
6 (5)	employment at life cycle 5	age at first marriage	0.03581 * (2.14991)	0.23501	0.23501
		constant	-0.6869031		
		F-value = 4.60821 significant at 0.05 level			
(6)	actual family size	education group 1 (less than 9 years)	2.14451 * (9.84039)	0.05069	0.05069
		education group 2 (9 to 13 years)	0.95597 * (6.54553)	0.03758	0.08827
		education group 3 (post-secondary)	0.79442 * (4.91686)	0.00027	0.08854

TABLE 7-1 SUMMARY OF FINDINGS (Cont'd)

Analysis (Chapter)	Dependent Variable	Independent Variables	B (t value)	Change in R^2	Multiple R^2
		Years worked	0.00679 (0.68935)	0.00008	0.08862
		constant	0.9251591		
		F-value = 25.25754 significant at 0.01 level			
(6)	post-secondary support group 1($1,000)	education group 1 (less than 9 years)	0.06723 * (1.79626)	0.00373	0.00373
		years worked	-0.00145 (-0.88393)	0.00114	0.00487
		education group 2 (9 to 13 years)	0.01040 (0.42847)	0.00022	0.00509
		education group 3 (post-secondary)	0.00341 (0.12718)	0.00002	0.00511
		constant	0.07392		
		F-value = 1.20165 not significant at 0.05 level			
(6)	post-secondary support group 2($1,000-3,999)	education group 1 (less than 9 years)	0.06978 * (1.69610)	0.00265	0.00265

TABLE 7-1 SUMMARY OF FINDINGS (Cont'd)

Analysis (Chapter)	Dependent Variable	Independent Variables	B (t value)	Change in R^2	Multiple R^2
		education group 2 (9 to 13 years)	0.02776 (0.67475)	0.00248	0.00513
		years worked	-0.00073 (-0.40450)	0.00046	0.00559
		education group 3 (post-secondary)	-0.00490 (-0.16626)	0.00003	0.00562
		constant	0.08191		
		F-value = 1.32205 not significant at 0.05 level			
(6)	post secondary support group 3 ($4,000-7,999)	education group 2 (9 to 13 years)	0.06155 (1.98677)	0.00517	0.00517
		education group 1 (less than 9 years)	0.06684 (1.39857)	0.00054	0.00571
		education group 3 (post secondary)	0.01692 (0.49464)	0.00026	0.00598
		years worked	0.00035 (0.16435)	0.00001	0.00598
		constant	0.093893		
		F-value = 1.40504 not significant at 0.05 level			

TABLE 7-1 SUMMARY OF FINDINGS (Cont'd)

Analysis (Chapter)	Dependent Variable	Independent Variables	B (t value)	Change in R^2	Multiple R^2
(6)	post-secondary support group 4 (> $8,000)	education group 2 (9 to 13 years)	-0.09970 (-2.39557) *	0.00875	0.00875
		education group 1 (less than 9 years)	-0.20385 (-3.17473) *	0.00728	0.01603
		years worked	0.00184 (0.65130)	0.00123	0.01726
		education group 3 (post secondary)	-0.01543 (-0.33578)	0.00012	0.01738
		constant	0.75028		
		F-value = 4.13848 significant at 0.025 level			
(6)	actual family size	education group 1 (less than 9 years)	2.14887 (9.06735) *	0.04753	0.04753
		education group 3 (post secondary)	0.82215 (4.87284) *	0.02309	0.07062
		education group 2 (9 to 13 years)	0.98404 (6.41945) *	0.01817	0.08879
		post secondary support group 1 (< $1,000)	0.66112 (3.16810) *	0.00999	0.09878

TABLE 7-1 SUMMARY OF FINDINGS (Cont'd)

Analysis (Chapter)	Dependent Variable	Independent Variables	B (t value)	Change in R^2	Multiple R^2
		post secondary support group 3 ($4,000-7,999)	-0.21300 (-1.29785)	0.00121	0.09999
		years worked	0.01192 (1.15183)	0.00015	0.10014
		post secondary support group 2 ($1,000 - 3,999)	-0.04506 (-0.23685)	0.00005	0.10019
		constant	0.90222		
		F-value = 14.84056 significant at 0.01 level			

Note: *= t value significant at 0.05 level.

Number of years worked, together with age at marriage, are positively related to female labour force participation. Fertility, as measured by actual family size, life cycle stages, and the remaining independent variables do not have significant effects on female labour force participation.

Analysis 2 examines the effects of the independent variables on female labour force participation at life cycle 1, when women have no children. It is found that the most important factors are, by order of importance, family income group 5 ($10,000 - 14,999), education group 2 (9 to 13 years) and post-secondary support group 3 ($4,000 - 7,999).

In Analysis 3, the effects of the independent variables on labour force participation of women in life cycle 2 (with children under 6 years of age) are examined. Actual family size and average interval between births are significant variables affecting female labour force participation in this life cycle. Actual family size is positively related to female labour force participation, contrary to the hypothesized negative relationship. F statistics for the overall regression is not statistically significant at the 0.05 level.

Analysis 4 examines the relationships between the independent variables and female labour force participation at life cycle stage 3 (with children under 6 and over 6 years of age). Number of years worked, post-secondary sup-

port group 2 ($1,000 - 3,999), age at first marriage, marital status, age at first birth and family income group 2 ($3,000-4,999) are variables significantly related to female labour force participation at this life cycle stage.

In Analysis 5, the effects of the independent variables on female labour force participation at life cycle stage 4 (with children over 6 years of age) are studied. Number of years worked and post-secondary support group 2 ($1,000- 3,999) are the significant variables.

Analysis 6 studies female labour force participation at life cycle stage 5 (when children are over 18 years of age). Age at first marriage is the only significant variable affecting female labour force participation.

Three hypotheses have been formulated for testing in the thesis. The hypotheses and the results are presented below and in Table 7.2.

Hypothesis 1 states that:

> "Women with relatively inexpensive job skills or low educational attainment are expected to have larger families than women with better job skills or higher educational attainment. It is expected that the former participate in the labour force even at inconvenient stages of the life cycle because of financial reasons."

Results of the study show that education is significant in determining actual family size and confirms the expected negative association. Number of years worked, an indicator of job skills, however, shows no significant relationship with actual family size. The second part of

TABLE 7-2 HYPOTHESES AND RESULTS OF TESTING

Hypothesis	Results
1 a. Women with relatively inexpensive job skills or low educational attainment are expected to have larger families than women with better job skills or higher educational attainment.	Accepted partially. Education is negatively related to actual family size, but work experience shows no significant relationship with actual family size.
b. It is expected that the former participate in the labour force even at inconvenient stages of the life cycle because of financial reasons.	Accepted partially. Women are unlikely to work when all children are under six years of age, but more likely to work when family income is low and with children under six and over six years of age.
2 a. During childbearing and childrearing years labour force participation rates will be low among women with close child spacing intervals.	Accepted. Women with close birth interval and very young children are less likely to participate in the labour force.
b. These women will more likely participate in the labour force after the youngest child reaches school age.	Rejected (due to lack of evidence).

TABLE 7-2 HYPOTHESES AND RESULTS OF TESTING (CONT'D)

Hypothesis	Results
3 a. Women with high educational attainment or employable skills are more likely to prefer 'high quality' children in the indirect economic sense. They are more likely to stay in the labour force longer in order to be financially secure to be able to assist children's post-secondary education.	Rejected. Low educational attainment is related to post-secondary support. Work experience has no effect on post-secondary support.
b. Such women are also more likely to have a small family size.	Rejected. Work experience and high post-secondary support are not significant on actual family size.

the hypothesis which states that women with inexpensive job skills or low education participate in the labour force even at inconvenient life cycle stages is only partially supported. The findings in the thesis show that women are unlikely to work outside the home at life cycle stage 2 when children are under 6 years of age. They are more likely to participate in the labour force at life cycle stage 3 with children under and over 6 years of age, and when family income is relatively low.

Hypothesis 2 states that:

> "During childbearing and childrearing years labour force participation rates will be low among women with close child spacing intervals. These women will more likely participate in the labour force after the youngest child reaches school age."

Results of the analysis show that the first statement in Hypothesis 2 can be accepted. It is found that women with close birth intervals and very young children at home (under 6 years of age) are less likely to be participating in the labour force. The second statement that women with close birth intervals will more likely participate in the labour force after the youngest child reaches school age is rejected for lack of significant evidence.

Hypothesis 3 states that:

> "Women with high educational attainment or employable skills are more likely to prefer 'high quality' children in the indirect economic sense. They are more likely to stay in the labour force longer in order to be financially secure. Consequently the families can assist

> their children in the acquisition of post-secondary education. Such women are also more likely to have a small family size."

The first part of Hypothesis 3 is rejected. It is found that low educational attainment is significantly related to post-secondary support and that work experience has no effect on post-secondary support. It is also found that women with high educational attainment have small families, and women who are willing to contribute minimal support to their children's post-secondary education have larger families. Work experience and high post-secondary support are not significant on actual family size.

To sum up, the findings in the thesis indicate that fertility and life cycle stages do not have significant effects on female labour force participation. Fertility and the socio-economic variables display different patterns of association with female labour force participation when life cycle stages are controlled. Work experience is found to be more important than educational attainment in explaining female labour force participation at a particular point in time. Fertility related variables, such as actual family size and interval between births, have significant impact on female labour force participation only in life cycle stage 2 (with children under 6 years of age). All other variables exert different strengths of influence on the labour force participation of women in different life

> their children in the acquisition of post-secondary education. Such women are also more likely to have a small family size."

The first part of Hypothesis 3 is rejected. It is found that low educational attainment is significantly related to post-secondary support and that work experience has no effect on post-secondary support. It is also found that women with high educational attainment have small families, and women who are willing to contribute minimal support to their children's post-secondary education have larger families. Work experience and high post-secondary support are not significant on actual family size.

To sum up, the findings in the thesis indicate that fertility and life cycle stages do not have significant effects on female labour force participation. Fertility and the socio-economic variables display different patterns of association with female labour force participation when life cycle stages are controlled. Work experience is found to be more important than educational attainment in explaining female labour force participation at a particular point in time. Fertility related variables, such as actual family size and interval between births, have significant impact on female labour force participation only in life cycle stage 2 (with children under 6 years of age). All other variables exert different strengths of influence on the labour force participation of women in different life

cycle stages. Age of respondent is the only variable which shows no effect on female labour force participation regardless of life cycle stage. Educational attainment is found to be negatively related to actual family size. This finding is consistent with the findings in many previous studies. Work experience, another indicator of human capital investment, is not significantly related to actual family size. It is also found that women whose education attainment level is 13 years or less intend to contribute the highest level of support to their children for post-secondary education.

7.2 Theoretical Implications

This section discusses the theoretical implications of the findings from this thesis. Some of the findings are similar to the findings of previous studies, but there are also some findings that are different to established theories. However, all of these provide additional insights to the subject matter. The theoretical significance of the findings for each variable will be discussed.

In the first analysis, life cycle stages are used as independent variables affecting female labour force participation of women in all life cycle stages. The relationship is not significant. In subsequent analyses, when life cycle stages are introduced as control, the impacts of the other exogenous variables emerge. This

is similar to studies which suggest that family life cycle is a strong intervening variable affecting the relationship between fertility and female labour force participation (Bumpass, 1968; Oppenheimer, 1974; Ostry, 1968; Sweet, 1970, 1973; Weller, 1976).

Throughout the thesis, two variables are used as indicators of fertility. These are actual family size and interval between births. They are significant variables in explaining female labour force participation in life cycle stage 2 (with children under 6 years of age). Both are positively related to female labour force participation. While the positive relationship between birth interval and female labour force participation is expected, the positive relationship between actual family size and labour force participation is not as hypothesized. In addition, the overall significance of the regression equation cannot be established. It is thus concluded that fertility has an undefined impact on female labour force participation and that its influence is inconclusive.

It is also found that fertility has a negative relationship with educational attainment. This finding is similar to other previous studies (Henripin, 1972; Cain and Weineger, 1973). Post-secondary support group 1 (less than $1,000) is positively related to fertility. This implies that women who have large families expect to contribute

minimal support to their children's post-secondary education.

Number of years worked is the most important factor explaining female labour force participation for women in all life cycle stages as well as in life cycle stages 1, 3 and 4. It is not significant in life cycle stage 2, when children are very young, and it is not significant in life cycle stage 5, when children are grown. In a study on ethnic differentials of fertility, and using data from the same survey (GAFS), Beaujot (1975) found that proportion of years worked was negatively related to fertility. Findings from this thesis, however, indicate that number of years of work is not significant in determining actual family size. The reason for this discrepancy lies mainly in the measurement of work experience. Beaujot's proportion of years worked is adjusted, whereas, number of years of work as used in the thesis, is unadjusted for age. Nevertheless, the findings on work experience is supportive of Mott's finding that labour force participation in one life cycle stage is a good predictor of participation in subsequent life cycle stages (Mott, 1972).

Educational attainment is found to have no significant impact on female labour force participation of women in all life cycle stages. Education category 2 (9 to 13 years) is significant in explaining labour force participation of women in life cycle 1 (with no children).

Educational attainment is not found to be important in all other life cycle stages. This contradicts Mott (1972) who found high employment among highly educated women at all life cycles. Either Edmonton women are different from Rhode Island women, or that the problem lies with the sample.

The impact of education on fertility is significant and negative, similar to previous studies (Henripin, 1972; Cain and Weineger, 1973; Rindfuss and Sweet, 1978). The effect of education on post-secondary support is significant. However, the pattern of relationship is not as expected. It has been hypothesized that women with high educational attainment would want to contribute substantially to their children's post-secondary education. On the contrary, it is found that with less than thirteen years of education - those without post-secondary education - expressed a willingness to contribute most to their children's post-secondary support.

Findings from the thesis show that family income does not have significant impact on female labour force participation in all life cycle stages. Income group 5 ($10,000-14,999), however, is found to be important in explaining female labour force participation in life cycle stage 1, before women have any children. It is also found that women in life cycle stage 2 - when children are very young, are not likely to participate in the labour force inspite of very low family income. For women in

life cycle stage 3, family income group 2 ($3,000- 4,999) reveals a negative relationship with labour force participation. This is not as expected. The irregular influence of family income in explaining female labour force participation suggests that its significance is inconclusive. One reason for this irregularity in the direction of relationship may be conceptual. Family income is composed of the joint income of both spouses if both work. In a case where only one spouse works, or in a case where the woman is a single parent, only the income of one person is accounted for. This may lead to incompatible data comparisons when both two-income and one-income families are studied together. Another reason may be the small sample after breaking down by life cycle stages and income groups.

Post-secondary support is used as an indicator of the amount of human capital investment the parent is willing to invest in her children. It is also used to approximate the 'economic quality' of children, a concept introduced by Becker (1960). Results from the thesis indicate that post-secondary support does not have significant impact on female labour force participation per se. When female labour force participation in each life cycle stage is studied, post-secondary support group 3 ($4,000-7,999) is found to be positively related to female employment in life cycle stage 1 (with no children). Post-secondary support group 2 ($1,000-3,999) is found to be significant but negatively

related to female employment in life cycle stage 3 (with children under and over 6 years of age). This implies that post-secondary support is an ideal that has significant consideration among women before they have children. By participating in the labour force at life cycle stage 1, they may be hoping to accumulate sufficient savings in the future to support children through post-secondary education. In later life cycle stages, reality may dictate that other factors are more important. Thus, the findings imply that the 'quality' of children as measured by post-secondary support has differential importance in the various life cycle stages. The concept 'quality' of children as studied in the context of post-secondary support has not been examined previously by other researchers. This investigation on the relationship between mother's education, life cycle stage and post-secondary support contributes to a fuller understanding of the demand for the 'quality' of children in a quantifiable aspect. The influence of education on post-secondary support is found to be significant in the sense that women with no post-secondary training tend to contribute substantial post-secondary support to their children. Number of years worked has no significant impact on post-secondary support.

Age at first marriage is positively related to female labour force participation of women in all life cycle stages. It is also positively related to female

labour force participation in life cycle stage 3 (children under and over 6 years of age) and 5 (children over 18). This implies that women who marry early are less likely to participate in the labour force in future life cycle stages. This is likely to occur because women who marry young are less likely to have strong preferences for work and other independent interests due to a lack of opportunity to acquire them before marriage. Women who marry late have the opportunity to develop certain expectations on individual life styles and aspirations of independence and career development. These women are more ready to seek jobs once their familial duties of raising children are taken care of.

Marital status is positively related to female employment as hypothesized but is significant only in life cycle stage 3 (children under and over 6 years old). Age at first birth is negatively related to female employment in life cycle stage 3 and is not as hypothesized. Age of respondent is not significant on female employment regardless of life cycle stage.

The findings from the thesis offer strong explanatory insights on fertility, life cycle stages and female labour force participation. This study has provided a detailed examination of the factors affecting female labour force participation in different life cycle stages. Although the differential patterns of association between most independent variables and female labour force parti-

cipation are identified, the determinants of female employment at life cycle stage 2 (with children under 6) cannot be identified. It is possible that other factors not included in this study exert important influence.

While most research is focused on fertility and employment as a function of earlier events, Mott (1972) and Groat et al (1976) have investigated the interaction of employment with fertility along a new dimension, the family formation process. This thesis has followed a similar path and has studied the integration of employment and fertility at different stages of the life cycle. It is directed toward the changing responsibilities and expectations inherent in each life cycle stage in today's society and the adjustment of the women to achieve their individual personal goals. The general increase in the educational attainment of women in North America in recent decades has also raised the employment aspirations of highly educated women. The traditional role of married women in the home is no longer appealing and acceptable to the contemporary women. An increasing number have been combining the roles of the housewife, mother and the career woman. Doubtlessly, these demanding roles require an extraordinary effort of management, understanding and support from the husbands and the children. The nature of the incompatibilities of these conflicting roles will also create stress and burdens on the family. The stress on the women is more apparent

and burdensome particularly when there are young children at home. Small children require constant caring and supervision. Unless babysitting and/or daycare arrangements can be made, mothers often prefer to stay home. It is usually the financially desperate or the career committed women who work outside the home at this life cycle stage. The thesis has found no significant relationship between the independent socio-economic variables and fertility, but has shown that women with children under six years of age are unlikely to be employed if they have a large family size and if the birth intervals are small. Earlier studies using similar indicators by Groat (1976, p.123) and Mott (1972) showed that employment early in a life cycle was highly associated with employment in later life cycle stages.

Findings from the thesis also support the family life cycle squeeze concept (Gove et al, 1973). Family income at both the beginning and the later stages and the expenditure required for the person concerned is considerably lighter. At the beginning of the life cycle, one is supported and provided for by the parents. Later on in young adulthood, income would be solely for personal use. Upon marriage and the births of children, the effects of the income squeeze start to show but will be compounded when the person has reached his capacity on the top of the occupational ladder. Usually in middle-age, when children enter college and require financial assistance, the income squeeze

reaches its intensive effect. However, later on when children become independent and no longer require support the squeeze eases. It is at this later life cycle that the person will be released from the squeeze impact.

This family life cycle squeeze concept applies to both men and women if both work and support the family together. In the thesis, the women studied also experience a similar pattern of squeeze which is not measured by income but by employment. Employment of women in earlier and later life cycle stages are independent of the demands of a particular stage of the family formation process. When children are small, the 'squeeze on employment' exerts an important impact such that the tendency to stay home is high.

The lack of relationship between education and the labour force participation of women in Edmonton is unexpected and contrary to the findings of many studies. However, Alberta has traditionally been a family oriented province. Economic robustness and the late boom associated with the petroleum industry expansion has not altered this prairie characteristic. Historical total fertility rates in Alberta have been higher than the national rates. In 1976, the ratio of total fertility rate for Alberta to the total fertility rate for Canada was 1.12. By 1981, this ratio has increased to 1.13. Among the western provinces of British Columbia, Alberta, Saskatchewan and Manitoba,

Alberta's total fertility rates have been the second highest, after Saskatchewan. This relationship has persisted over the past decade. Within the province, the total fertility rate of 1.74 for Census Division 11 which includes the city of Edmonton is higher than the toal fertility rate of 1.65 for Census Division (Calgary). This suggests that women in Edmonton may be more family oriented than Calgary. Although these observations cannot directly explain the lack of relationship between education and female labour force participation as found in this study, they do provide some indication that women in Alberta have specific priorities in life which have not been identified and assessed in this study.

The negative relationship between education and family size, a universally observed phenomenon, has been supported by this study. The explanation is that educated women are receptive to innovations in contraception technology and family planning. It is also easier for them to understand contraceptive methods and to administer them accurately. The result is a smaller family size.

The U-shaped relationship between age and fertility is another universal phenomenon for developed countries. Fertility is high for women in the young adult age group of 20-25. After this peak, fertility declines. The trends of small families and high female labour force participation have been established and made possible through medical advancement in the area of contraception and family planning.

Higher fertility is observed for women in the older age groups. For these women, family planning was not prevalent during their childbearing years. As a result, they generally have larger family sizes compared to the younger cohorts. Findings from this thesis support the U-shaped relationship between age and fertility.

The testing of the Becker hypothesis on the 'quality' of children in the thesis has adopted only one aspect, that is, the expected financial support to children's post-secondary education. Presumably, the 'quality' of children as measured by the amount of expenditure on their human capital investment (education) is an incomplete indicator. In this instance, children are treated as consumer durables, and the price infers the 'quality' of the commodity. In reality, many factors account for this investment. Peer pressure, the common pressure of 'keeping up with the Jones's', life style, income, value on education, class, aspiration for upward mobility, dissatisfaction of self's current socio-economic status are some relevant aspects which deserve investigation. Findings from the thesis suggest that there is some support for the relationship between dissatisfaction of self's current socio-economic status and upward mobility aspirations, and post-secondary support. It is also found that education and life cycle stage have some influence on the amount of post-secondary support intended for children. These are significant contributions to the understanding of the

'quality' of children concept which has never been studied empirically.

7.3 Policy Implications

The findings from this thesis are useful as a tool to assess the impact of the independent variables on female labour force participation. Regression analysis is a powerful predictive analysis by which given the information on the exogenous variables the outcome of the endogenous variable can be predicted. Female labour force participation has increased dramatically in North America in recent years. This results in an overall increase in the gross national product, increase in consumer spending, and an increase in tax revenues. The latter, in particular, enables the public sector to provide for extensive social programs. The associated decline in fertility level in recent years implies that fewer resources will be needed to provide educational, cultural and medical facilities for children. Social programs and educational facilities planning is thus likely to gear to the needs of other groups, including the aged, the handicapped, the unemployed and others.

The findings from this study enables one to identify and evaluate the strengths of the underlying factors affecting female labour force participation. Policy makers can identify the impact of certain public policies which may alter the characteristics of the independent variables

studied on female labour force participation. For example, if age at first marriage stays high, it is reasonable to expect high labour force participation of females who marry at an older age. These women will also be likely to participate in the labour force in subsequent life cycles in the future. Given the female population, the impact on the female labour force is evident. Policy makers may also wish to manipulate the future female labour force level by implementing programs or policies that will discourage early marriage, facilitate or encourage job training and upgrading for women, provide scholarships and awards on professional achievements, provide adequate day care facilities, legislate equal work for equal pay, establish flexible hours for working mothers and ensure improved working conditions. These are some of the possibilities that policy makers can embark on. Although the regression equations have a potential for projections of female employment, this use is not recommended at present due to several limitations of the present study. These limitations are presented below.

7.4 Limitations of the Present Study

The limitations of this study can be identified as follows:

(1) The amount of variance explained - R^2 - is not impressive. In the analysis of female labour force participation for all life stages, the R^2

is 0.04204. In the analyses for individual life cycle stages, R^2 ranges from 0.03927 to 0.31569. In the analyses on actual family size, R^2 ranges from 0.08862 to 0.10019. In the analyses on intended post-secondary support, R^2 ranges from 0.00511 to 0.01738.

(2) The number of employed respondents in the survey amounted to 5 per cent of the 665 respondents who answered the question on employment. A total of 1,045 women were interviewed in the Growth of Alberta Families Study. The survey sample, nevertheless, is representative of Edmonton women in other aspects, particularly in ethnic composition and age structure.

(3) The use of dummy variables for education, income, female employment, post-secondary support, marital status and life cycle stages in the analyses can pose some interpretation problems when the findings are compared with those from other studies.

It is suggested that the reader should consider these limitations when using the findings from this thesis for further research work.

7.5 Suggestions for Further Research

This thesis has attempted a detailed analysis of the associations between female labour force participation, fertility, life cycle stages and related socio-economic variables. It is found that the factors influencing female labour force participation explain only a limited amount of variance in the relationship. It will be a potentially useful area to explore the other unidentified variables that are responsible for the associations. One particular area of interest is to identify the factors influencing female employment when children are very young. Some of

the factors may be social - such as tradition, sex roles, peer and elder pressures, or psychological - such as maternal satisfaction in nurturing and the need to be close to very young children, or institutional - such as lack of adequate day care facilities. Another area worthy to study further is related to the preferred quality of children. It is found that women with no post-secondary education tend to support children through post-secondary education. On the other hand, women with post-secondary education do not intend to contribute substantially to children's advanced education. It will be interesting to find out the reasons for these observations. A third area useful to pursuit is to study female labour force participation patterns when both age and life cycle stages are controlled. From the findings of the thesis, age at marriage shows up to be significant in explaining female labour force participation in all life cycle stages combined as well as in life cycles 3 and 5. It is suspected that women of different age cohorts may have similar favorite age intervals for marriage. By combining age and life cycle stage, significant relationships between the underlying factors and female labour force participation may surface. Lastly, it will be most useful if similar studies can be conducted on foreign data using similar fertility surveys. Similarities and differences in findings can supplement established studies and contribute to broader theoretical significance.

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